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ABSTRACT

Students entering beginning computer courses have a wide range of experiences with and prior learning in the use of computers. Additionally, adult learners who have returned to school at the community college level may be apprehensive and anxious about computer use. A hypertext computer-assisted instruction (CAI) program was developed in order to teach the disk operating system (DOS) to beginning classes with different backgrounds. The CAI program was demonstrated in class, and the students used the program in a computer lab. The results showed that more students passed a DOS proficiency test after eight weeks using the CAI method than students using the traditional method. Student attitudes also improved. It may be concluded, based on these results, that the hypertext CAI software program should be considered for beginning classes. Appendices include the hypertext CAI documentation and the program handout. (26 references) (DB)

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A HYPERTEXT COMPUTER-ASSISTED INSTRUCTION (CAI) PROGRAM: TEACHING THE DISK OPERATING SYSTEM (DOS) TO COMMUNITY COLLEGE STUDENTS

by

David D. Blanchard

A Practicum Report

submitted to the Faculty of the Center for the Advancement of Education of Nova University in partial fulfillment of the requirements for the degree of Master of Science.

The abstract of this report may be placed in a National Database System for reference.

April, 1990

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Authorship Statement

I hereby testify that this paper and the work it reports are entirely my own. Where it has been necessary to draw from the work of others, published or unpublished, I have acknowledged such work in accordance with accepted scholarly and editorial practice. I give this testimony freely, out of respect for the scholarship of other workers in the field and in the hope that my work, presented here, will earn similar respect.

Signed David D. Blanchard

ABSTRACT

A Hypertext Computer-Assisted Instruction (CAI) Program: Teaching the Disk Operating System (DOS) to Community College Students.
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Students entering beginning IBM-compatible computer courses have a wide range of experience in the Disk Operating System (DOS). A large number have little or no knowledge and are very apprehensive and anxious. Others have experience and are bored when the rest of the class is learning DOS. A hypertext computer-assisted instruction (CAI) program was developed to teach DOS to a beginning class with a variety of backgrounds. The CAI program was demonstrated in class, and the students used the program in a computer lab. The results showed that more students passed a DOS proficiency test after eight weeks using the CAI than using the traditional lecture/lab method. They also recorded higher grades. In addition, the students had higher opinions of the CAI method than the traditional method. The beginning student's opinions improved the most. It was concluded that the hypertext CAI should be considered for this level of class, offering the benefits of reduced class time, better learning, and improved student opinions. Appendices include the hypertext CAI documentation and the program handout.

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CHAPTER I

Purpose

The Setting

The setting for this project was a medium-sized community college in a large metropolitan area. This college was established in 1970 as a self-contained college. This college serves a neighborhood of about 100,000 to 150,000 residents in meeting the diverse educational needs of the community by offering accessible and excellent adult education opportunities. The college resides on a campus of 160 acres, having an enrollment of about 9,200 students, equating to about 4,000 FTE (Full Time Equivalent). The faculty consists of 110 full time, 80 day part time, and 150 evening part time teachers. More students attend the college during the daytime than during the evening. The student population closely reflects the ethnic makeup of the county that it serves.

The Mission of the Community College

The mission of the community college is found in the 1989-90 General Catalog (1989:6) which stated the following:

> As a comprehensive community college, we are committed to offering:

1. General education for all students, designed to enable them to exercise their obligations and privileges as citizens with intelligence and informed judgment;
2. The first two years of baccalaureate education;
3. Occupational education, including courses and degree programs designed to provide job training, retraining, and upgrading of skills;
4. Basic skills education, including remedial and developmental instruction, adult basic education, and other educational programs designed to meet individual goals and to provide under-prepared students with access to postsecondary education;
5. Adult continuing education, including credit and non-credit adult and continuing education classes, workshops, seminars, forums, and cultural programs, designed to provide opportunities for lifelong learning;
6. Corporate service programs, focusing on linkages with business, industry and governmental agencies to plan, develop and implement unique instruction packages, education and training programs and/or resource associations to develop well-educated work forces to meet the growing and changing needs of the .. marketplace.
7. Public service programs of an education nature intended for the enrichment of the community.

Demographics

The students taking courses at this community college are customarily adults and differ from typical college students, such as those that attend a four-year colleges or universities. The college's Information Update (1988) reports the following student profile:

1. Most (80 percent) are employed, and half of those work full time.
2. Most (81 percent) attend college part time compared with the national average of 66 percent.

3. More (55 percent) of the students are female.
4. The average age of the students is over 30.
5. Only 22 per cent are 18 to 22 years old, while many (7 percent) are over the age of 50.
6. Many (68 percent) are re-entering school, having graduated from high school over 15 years ago.
7. Most are taking the courses just to learn about computers, not to receive a degree or certificate.
8. Only 28 percent intend on going to a four-year college or university for a degree.
9. Only 8 percent are newly graduated from high school each fall.

In summary, the student population is a very diverse group of individuals, ages, and backgrounds.

The Computer Information Systems Programs

As a part of the Occupational Education program, the college offers the Computer Information Systems curriculum that provides training for various entry-level positions in computer systems. This is a two-year career program that leads to an Associate of Applied Science Degree in Computer Information Systems, requiring 64 credits. Certificates of Completion in Computer Information Systems, Personal Computer Applications, and

Business Programming are also offered, requiring 34 credits. According to the Community College's Information Update (1988:2),

> Of those students who declared their intention to complete a program, 40 percent are enrolled in the occupational division; 28 percent intend to transfer to a four-year college or university after receiving an Associate Degree.

The Computer Information Systems program is a part of the occupational division, and about ten students receive a certificate or a degree each year.

These CIS programs required successful completion of a course titled, "Survey of Computer Information Systems", CIS 105. This course was an introduction to the topics in computers and is described in the 1989-90 General Catalog (1989:49) as follows:

> Overview of computer information systems, fundamental computer concepts, and programming techniques. Hands-on experience with selected business software and one programming language. Prerequisites: None.

This course is also required for Accounting, Banking and Finance, Business Administration, General Business, Hospitality Management, Management, Middle Management, Office Administrative Services, Public Administration, and Word Processing Certificates and Associated Arts Degrees. CIS 105 also transfers for full credit to the three state universities. An average of about 450 students enroll in 20 sections of CIS 105 each semester.

The "Survey of Computer Information Systems" Course, CIS 105

The Survey of Computer Information Systems course is the initial course in the Computer Information Systems (CIS) curriculum. About 80 percent of the courses in the curriculum use the IBM Compatible computer and require knowledge of the Disk Operating System (DOS). The Survey of Computer Information Systems course covers application software that each require the ability to start the computer, use DOS, and run the application. The following software is used:

WordPerfect 4.2, by WordPerfect Corporation

VP-Planner, by Paperback Software, International

dBASE III Plus, by Ashton-Tate Corporation.

Experience of the Writer

This writer worked full time for a major information systems company as a specialist in higher education computer applications. In addition, he taught part time at this community college in the Computer Information Systems program, teaching CIS 105 and other courses. The author assisted a part time evening teacher who implemented the project.

The Target Population

In Fall, 1988, the author and another teacher each taught a CIS 105 section using the standard method of teaching DOS, using lectures and lab work, with a handout. These sections were used to evaluate the student reaction to the standard method and to identify the problems with teaching DOS in this way. These classes were identified as "Class A" for the author's class and "Class B" for the other teacher's class.

In the Fall, 1989 semester two sections of CIS 105 used the CAI program developed for this project to learn DOS. These sections were used for developmental testing and were called "Class 1" and "Class 2". In the Spring, 1990 semester, the CAI program was implemented in two sections of the CIS 105 course. This target population was known as "Class 3" and "Class 4", and they used the CAI program to learn DOS.

DOS Knowledge

Knowledge of DOS is required by the student to complete CIS 105 successfully; however, DOS is not a prerequisite. Instead, most instructors used the traditional method, consisting of a lecture covering DOS, followed by an assignment using the "CIS 105 Supplement: Disks and DOS" handout developed by two instructors and included in Appendix A:53-62. This took class time at the start of the semester. In addition, this was repetitive for

those already knowledgeable in DOS. This method resulted in only 60 percent of the students in Class A (the author's CIS 105 class in the Fall of 1988) achieving a grade of 80 percent or greater on a DOS Proficiency Test.

A survey was used to measure the student's level of experience in DOS and computers in Class A and Class B. Students were asked to answer the question, "What is the level of experience before taking this class in DOS and in Using a Computer?" The survey questionnaire is shown in Appendix B:63-64. A summary of the results is shown in Table 1.

Table 1

Student Survey of "CIS 105 Supplement: Disks and DOS"
Summary of Results
Classes A and B, Fall, 1988

Experience	DOS	Computers
None	51%	27%
Very Little	22%	15%
Some	15%	27%
Quite a Lot	10%	22%
Proficient	2%	10%

Question: "What is your level of experience before taking this class?"

The results of the survey indicated two characteristics of these classes. Experience with computers varied from 10 percent "proficient" to 27 percent with "none". There were all levels of DOS experience represented. Secondly, by contrast, DOS experience was very low with 73 percent of the classes reporting "none" or "very little".

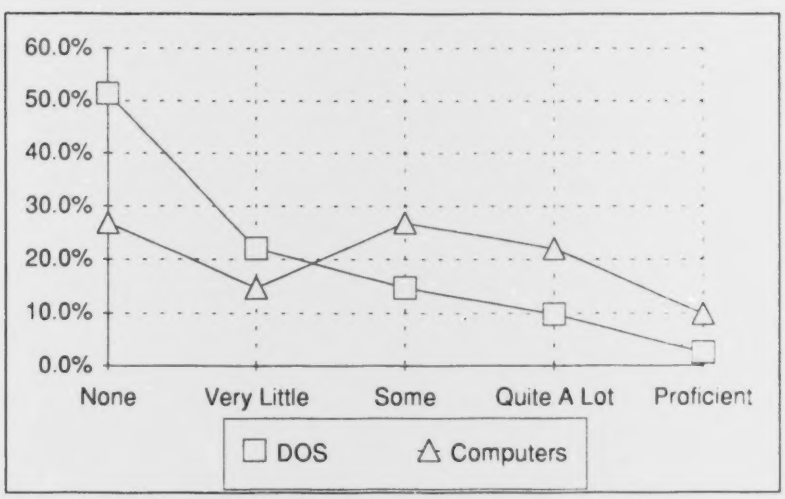

Figure 1
Survey of Computer Information Systems Classes A and B, Fall 1988
Amount of Experience in Computers and DOS

Student Opinions

The same survey taken in the fall semester, 1988 CIS 105 classes also explored the student's opinions of the "CIS 105 Supplement: Disks and DOS" handout for usefulness in helping them learn to use DOS. The results were widely split, with 43.4 percent of the students reporting the materials "helpful" or "made lab easy" (which was classified as "satisfied"). Another 33.3 percent reported "helpful" (termed "neutral") , and the remaining 23.3 percent rated the materials "impossible" or "difficult" (termed "unsatisfied").

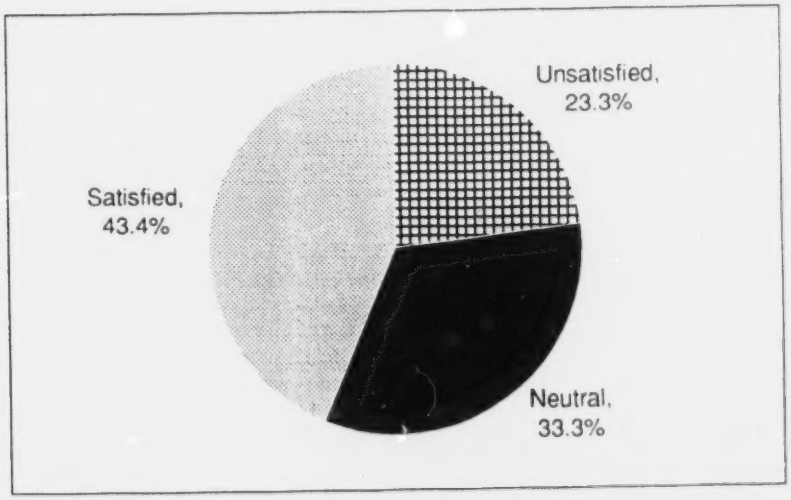

Figure 2
Survey of Computer Information Systems Classes A and B, Fall 1988
Opinion of "CIS 105 Supplement: Disks and DOS"

Correlation of Experience and Opinions

In comparing the results of the survey for the two classes, it was noticed that those dissatisfied with the materials were those with the least DOS experience. This feeling of computer anxiety was discovered in reviewing the optional remarks of the survey where students made comments such as "I could not have gotten through the handout without the help of the assistants" and "the DOS supplement handout was a bit difficult to understand." This demonstrated that the student with less experience, the beginner, had a more difficult time with the teaching approach lecture/lab assignment and the use of a handout.

The survey results were evaluated to see if beginning students had a different opinion of the teaching approach than more advanced students. The students were divided into two groups: students reporting "None" for DOS experience and all other students. The beginning student replied unsatisfied ("impossible" or "difficult") 45 percent of the time; the others replied unsatisfied only 24 percent of the time.

Problem Statement

There are two general problems that hinder teaching DOS to community college students that this project sought to solve:

1. A large number of students have little or no knowledge of DOS, a prerequisite for successful completion of the course. These people are very apprehensive about the class and need a great deal of attention to get over their anxieties. Almost half are not satisfied with the current method of teaching DOS.
2. In addition, students taking CIS 105 have a wide variety of backgrounds as shown in the survey results. Experience with DOS and computers ranges widely. Some have no experience, and some are proficient. Those with no experience are frightened and afraid of trying new skills. Those with a lot of experience are bored while the basic skills are covered.

Objectives

This project was to develop a Computer-Aided Instruction (CAI) program that could be used to teach DOS to students with varied levels of experience. The objective of this program was to teach DOS so that, after eight weeks of class, at least 80 percent of the students taking the course would pass a DOS proficiency test with a grade of at least 80 percent.

In addition, better learning takes place when the student is more relaxed and comfortable with their situation. This is especially true for the adult learners dealing with computers for the first time. Therefore, it was also the objective of this project to improve the student's opinion of the method of learning DOS, as measured in a survey, by cutting the number of students dissatisfied in half, resulting in less than ten percent of the students rating the program as "Impossible" or "Difficult to Use".

CHAPTER II

Research and Solution Strategy

The Adult Learner

The subjects of this project were the students of the "Survey of Computer Information Systems" class at a community college, the first computer class in the Computer Information Systems (CIS) curriculum. The majority of the subject group ranged from 18 to 60. Murk (1987:295) defined adult learners as "individuals who are over 25 years of age and who, in most cases, have not been engaged in formal learning for several years." Traditional learners, on the other hand "are 18 to 24 years of age and who are currently enrolled in a college or university." Therefore the majority of these subjects were considered "adult learners".

Learning Styles

Murk (1987) studied the similarities and differences in learning styles for adult learners and traditional students, and he and found the following:

1. Similarities
    a. Both want and expect to learn
    b. Both have the same computer skills.
    c. Both prefer hands-on exercises.

d. Both prefer practical applications over historical references.

e. Both have computer anxiety.

f. Both have learning obstacles, but in different order of importance. Traditional learners biggest obstacles in order of importance were personal problems, other school activities, and family problems. Adult learners obstacles were in the order of personal problems, problems at work, and family problems.

2. Differences

a. Adult learners have less time to study.

b. The gender emphasis is reversed. Traditional students are 35% women vs. 54 percent for adult learners.

c. Adult learners have more support equipment at home, ie. home computers.

d. Adult learners need more assistance with hands-on.

e. Adult learners have more enjoyment and higher self-esteem after learning.

Adult Learner Problems and Needs

Another positive factor for adult learning was found to be control over learning. Mills and DeJoy (1989) found that the self-directed adult learner needs and likes to be in control of the learning experience. Adults

are intimidated by learning how to operate new appliances, such as video tape recorders, microwave ovens and computers. This has been called "computer anxiety" and is a very serious problem to be addressed in teaching adult learners.

Cambre and Cook (1987) found that adult learners were more anxious than traditional students and that females were more likely to suffer from computer anxiety than men. Honeyman and White (1987) stated that computer anxiety can be lessened by direct exposure to computers, such as hands-on training as opposed to lecture.

Adult learners had longer attention spans but were less responsive to visual learning than traditional learners because the younger generation has been weaned on TV, according to Harte (1987), who explored the use of computer software for young and adult learners. Therefore, although computer games are excellent learning tools for problem solving and thinking, they need to be used judiciously with adults.

Some teachers like to use humor in their teaching. How should you use humor with adult learners? Stohmer (1987) explored some of the differences in humor for learners of different ages. Humor is viewed very differently between age groups. The main factor to consider is that humor must be intellectual demanding for adults, not crude or slapstick (ie. the chicken crossing the road).

Guidelines for Teaching to Adult Learners

In summary, the traditional students and adult learners have the same learning styles, but the differences need to be addressed. Therefore, except for accommodating the differences, traditional methods can be used for teaching computer skills to adult learners. To accommodate these differences, it is suggested that the following general guidelines should be followed in teaching computers to adult learners:

Encourage hands-on to reduce computer anxiety.

Emphasize the practical use of computers as opposed to theory.

Give control to the learner over the learning experience.

Be careful with the form of humor used.

Possible Solutions

The traditional method used to teach this class has been to present a lecture on DOS, followed by a lab assignment, to learn DOS functions in an open computer lab. A handout, "DOS Supplemental Handout" was used to lead them through the assignment and exercises. Lab Assistants were available in the lab to help them with questions and problems. This caused a great deal of computer anxiety for those new to computers. They spent long hours in the lab doing the assignment and dominated the time of the lab assistants.

The following solutions to teaching DOS were considered:

1. Improve the Handout

The handout was cluttered, difficult to read and follow. Terminology was used that was ill-defined and hard to understand. Although the handout can be improved, it is felt it would have a minimal impact on the beginning adult learner.

2. DOS Prerequisite

The department considered requiring that "Beginning DOS Operations", BPC 108, be taken before CIS 105. This has not been done because CIS 105 is a prerequisite for many other courses. Making DOS a prerequisite would delay a student's entry into the curriculum, causing loss of interest and dropping out.

3. Teach DOS in the Computer Lab

If the class were conducted in the Computer Lab those with little or no background would get more attention. Pairs of students could be assigned to a computer. The students could be directed through the assignment with adequate help from the teacher and Lab Assistants. Anxiety would be reduced for the beginners by immediate help and personal attention when they had questions. However, those proficient

and knowledgeable would be bored. This solution is not possible because of the limited size of the lab and the large numbers of students enrolled in CIS 105.

4. Use Computer-Assisted Instruction (CAI)

A CAI program is an instruction delivery system that uses a computer to deliver the material. It is designed so that progress through the course is done under control of the learner, thus accommodating the adult learner. Weller (1988:24) stated that CAI is successful because of the large amount of control that the learner has over the instruction.

> The more control the learners feel they have, the more involved they will be in the instruction.. The learners should be given the option of fast or slow learner paths, rather that being forced to follow a linear path throughout the lesson.

In the classroom situation described in this project, it is important that those with DOS knowledge be able to progress through only those parts of the CAI course that fill gaps of knowledge. On the other hand, the beginning student must be able to progress through the CAI course in a linear, structured fashion. This is the solution that was selected to be implemented.

Hypertext

The "Hypertext" concept was developed by Dr. Theodor Nelson, starting in about 1981. Hypertext is a system of accessing information employing the principle of using a single word, placed anywhere in a normal text document, as the key to another piece of text elsewhere in the document. In hypertext, if you see a key word that you want to know about, you select that word, usually with a pointing device, and the screen displays text relating to the key word. The meaning of hypertext has since grown to include many different media forms, such as graphics, video tape, compact disk, etc. This broader meaning is called hypermedia.

This ability to access information that the reader is interested in allows hypertext to be used for CAI. A student controls access to information in an intuitive way without regard to structure of the subject matter. Carr (1988:9) stated that "hypertext, used properly, permits the student to concentrate on the material without being distracted by the system which delivers it." Hypertext has been advocated for many subjects and across many disciplines. Tchudi (1988:29) advocated its use in writing,

> My program for critical thinking, then, calls for multidisciplinary exploration of a wide range of topics, selected by students and teachers, drawing on the hypertext of resources: great books, no-so-great-but-useful books, mass media, computers, institutions, fellow citizens.

The student can access the information in a sequential or non-sequential fashion. The sequential or linear method is the traditional method used in a book or lecture where the material is delivered front-to-back in a structure defined by the author/lecturer. Using hypertext the beginning student can access the information sequentially to learn structure with content, whereas the advanced student may access only new information to include in the existing student's structure. Gray (1987:54) found that students using the non-sequential method "performed better on a comprehension measure, but not on a retention measure." Hobbs (1987:297) agreed and stated that to be true because "learning consists of not simply storing and retrieving knowledge units in isolation, but of constructing links between them." Jonassen and Hannum (1987:8) stated that "Probably the single most important design issue raised by computer-based instruction has been learner control."

The use of hypertext for learning has not been greeted with universal accord, as reported by Maguire (1988:113) whose article in PC Week Magazine was titled, "Debate Rages over Benefits of Hypertext as a Training Tool". Maguire stated that the advantages of Hypertext were the following: "Hypertext is flexible enough for all levels of computer users, and hypertext motivates the least motivated person, and makes the most motivated feel unconstrained."

Marchionini (1988:9) agreed and stated:

> There are three main characteristics of hypermedia systems that have great potential for learning and teaching. First, hypermedia systems allow huge collections of information in a variety of media to be stored in extremely compact form and accessed easily and rapidly. ... Second, hypermedia is an enabling rather that a directive environment, offering unusually high levels of learner control. ... Third, hypermedia offers the potential to alter the roles of teachers and learners and the crucial interactions between them.

Selection of Hypertext

For this project, hypertext was picked as the method of delivering a CAI course teaching the Disk Operating System because of the following:

1. The ability of the **beginner** to access the information in a structured or sequential fashion.
2. The ability of the **intermediate or advanced** student to access the information that is new without losing interest.

Principles of Designing Hypertext

The basic method of developing a hypertext CAI course is to organize the material in sequential fashion, as one would organize a book. Then the relationships between topics and key terms must be identified. There are eight major principles for authoring good hypertext, according to Kearsley (1988):

1. Chunking. The information needs to be organized into small "chunks" or topics or themes or ideas. These chunks represent nodes in the knowledge database. Wedman and Ragan (1986) defined two methods of organizing the structure. These were hierarchy and elaboration. The hierarchial method was chosen for this project, based upon their outline.
2. Inter-relationships. The links that offer logical connections between the topics should be identified. A large number of links makes the hypertext connectivity rich and interesting. Too many, however, will cause confusion. Each link should serve a clear purpose.
3. Consistency of Document Names. As the number of topics grows, some naming convention must be used to identify the links. There are two naming systems: using mnemonic names to identify the content and using sequential numbers, such as "CPU001", "CPU002", etc. The later was chosen for this project.
4. Master Reference List. Creation of a master list of topics is essential to ensure correct linking. The reference list serves as an index to locate topics and can be used to identify all links to and from the topic.

5. Simplicity in Traversal. Navigation through the subject matter should be simple, intuitive, and consistent throughout the system. Morariu (1988:19) stated that this is important to help the learner who "should be able to focus on the content and not the operation of the program."

6. Screen Design. Screens should be designed so that they can be grasped perceptually. That is, the author should spend a lot of time with visual layout of the screen presentations. Duin (1988:49) said that

> Students also depend on online cues in order to proceed through computer-assisted instruction. The use of headings, underlining, boldface printing, changes in typeface of style, or a change in placement, can all act as reader cues.

7. Low Cognitive Load. The CAI hypertext program should minimize the burden on the student's short-term memory. The user should not have to remember things from one screen to another.

8. Early Reviews. The database should be subjected to technical, legal, and management reviews as early as possible while changes are still easy.

Design Considerations

There are many elements to consider in the specific design of the CAI course. Jonassen and Hannum gave an excellent set of practices to follow in course design related to satisfying the principles of learning, based upon research. This project attempted to follow many references in the literature to improving the effectiveness of CAI. Poppen and Poppen (1988:40) who evaluated the use of behavioral principles in software, stated that

> In order to increase the effectiveness of software and to enhance the impact of the microcomputer in education, software designers should begin to utilize these principles in their programs and to empirically evaluate their effectiveness.

CHAPTER III

Methodology

The purpose of this project was to develop and use a hypertext computer-assisted instruction (CAI) program to teach the Disk Operating System (DOS). The subjects were students taking the Survey of Computer Information Systems course, CIS 105, at a medium-sized community college.

Computing Environment

The computing environment at the community college was as follows. The CIS courses all shared a large computer laboratory for completing assignments. The CIS 105 students were assigned the IBM PS/2 Model 50 systems in the lab. The application programs, VP-Planner, WordPerfect, and dBASE were stored on the fixed drive in separate subdirectories. Each used a 3.5" diskette drive for student data and programs. Each student was encouraged to reboot the system when starting each session to ensure a standard, well running system. IBM DOS Release 3.3 was used with a special menu system to help users get started.

Selection of Hypertext Program

The following IBM compatible hypertext programs were investigated for use in this project:

Guide, written by
OWL (Office Workstations, Ltd) International,
14218 NE 21st Avenue,
Bellevue, WA 98007.

Linkway, written by
Washington Computer Services,
Bellingham, WA,
and marketed by
IBM Education Systems,
Atlanta, Georgia.

PC-Hypertext, written by
Neil Larson, MaxThink,
44 Rincon Road,
Kensington, CA 94707.

This last product and its supporting programs were selected to be used to develop and implement the CAI course for the following reasons:

1. The run-time version of PC-Hypertext was free and therefore inexpensive to implement on multiple systems in the computer lab.
2. MaxThink provides supplemental tools that are essential for constructing structured hypertext systems.
3. PC-Hypertext runs on an IBM-compatible system with as little as 256K of memory.
4. PC-Hypertext is easy to use, needing only six keys (four arrow keys, enter, and escape) to operate.
5. The performance was excellent on the PS/2 Model 50 since it was text-based. In addition a special file retrieval system is used to be able to access very large numbers of files rapidly.

Development Tools

MaxThink, the developer of PC-Hypertext, produces other programs to assist in the organization and development of hypertext programs. These are as follows:

1. MaxThink is a text processing and outlining program for preparing hierarchial structures. MaxThink was used to create the structure for linear presentation of the material on DOS.
2. Houdini is a relational word processor to organize subject matter in a cross-referenced network. Houdini was used to create the hypertext links to topics in ASCII format.
3. HyperLink is the hypertext construction toolkit. Some of these tools were used to convert the network into a hypertext network in binary format. Binary files load faster and provide protection against modification, an important consideration in a lab environment.
4. Galaxy is a word processor which can be used to develop the textual material. Any word processor that can create ASCII files will also do. This project used DisplayWrite Assistant, an IBM product that is easy to use. It has line drawing capability which is important to create eye-appealing screens.
5. PC-Hypertext is the run-time system for hypertext networks created by HyperLink and available at no cost.

Program Development

The first step was to develop a structure for presenting the material by creating an outline of the topics. This outline, CIS 105 HELPER Outline, is the same one that had been used to present the lecture material on DOS. The outline is included in Appendix C:65-67.

Next, the structured material was divided into "chunks" of information to be presented in one to three screens on the PS/2. Topics that were too large were broken into several chunks. These chunks are called nodes for presentation by PC-Hypertext.

The nodes were then created on the word processor in ASCII format, using several rules. The information must fit on the screen size of 24 rows of 80 characters each. The title of the topic was shown in the top line of the screen with a box around it. If multiple screens were used, the words "MORE" appeared in the middle of the bottom row. The screens must not be full of text with ample "white space" on each screen. Examples must be used, mimicking the actual screen appearance. Line drawing was used to draw attention to key points. Each node was identified by a file name using a simple classification system, ie. "FILEXX", where XX was a number from 00 to 25, and the file name appeared in the lower left hand corner. The files were then indexed and listed in a file called "REF" which is included in Appendix D:68-72. The nodes are included in Appendix E:73-113.

Next, the linkages were developed across topics. For instance, the topic that described floppy diskettes related how the data is stored on the diskette. This may prompt a question on how the student would format the diskette. So a link was needed to be established between the two topics. This was done by taking the copies of the nodes and spreading them out on the floor. Then the links were added by reading each node, noting desirable links to other nodes, and pencilling it in. This is done in PC-Hypertext, for example, by imbedding the following: <FILE14 Format Command> The brackets indicate a link, showing the filename. The name of the file was optional, but was used to identify to the student the topic that can be linked.

The Houdini program was then used to develop the core structure of the hypertext program, with the MaxThink outline as input. This created the main menu and the first and second level hierarchy structure. The Houdini program was used to document the hypertext network by printing a HIPO (Hierarchy plus Inputs, Processing, and Outputs) text format. This shows the relationship of the PC-Hypertext menus and the movement when pressing arrow keys. This structure is included in Appendix F:114-126.

The last step was to use the HyperLink tools to tailor the main menu screen and create the binary network that the PC-Hypertext program used. The program was titled, "CIS 105 Helper", which appeared on the screen of the program.

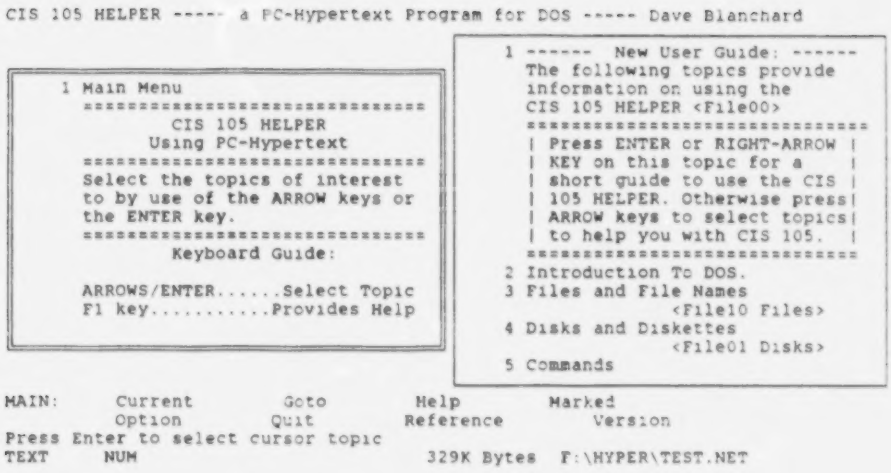
CIS 105 HELPER ----- a PC-Hypertext Program for DOS ----- Dave Blanchard
1 Main Menu
CIS 105 HELPER
Using PC-Hypertext
Select the topics of interest to by use of the ARROW keys or the ENTER key.
Keyboard Guide:
ARROWS/ENTER.....Select Topic
F1 key.....Provides Help
1 ------ New User Guide: ------
The following topics provide information on using the CIS 105 HELPER <File00>
Press ENTER or RIGHT-ARROW KEY on this topic for a short guide to use the CIS 105 HELPER. Otherwise press ARROW keys to select topics to help you with CIS 105.
2 Introduction To DOS.
3 Files and File Names <File10 Files>
4 Disks and Diskettes <File01 Disks>
5 Commands
MAIN: Current Option Goto Quit Help Reference Marked Version
Press Enter to select cursor topic
TEXT NUM
329K Bytes F:\HYPER\TEST.NET

Figure 3

CIS 105 HELPER, a Hypertext CAI
Start-Up Screen

Operating PC-Hypertext

The PC-Hypertext main menu screen, created by the print screen command are shown in Figure 3. This shows the main menu as it would appear when first starting the program. The lay-out includes two windows and a command line along the bottom. The left window is the "parent window" and the right window contains the "current window". The parent is the higher topic in the hierarchy. The current window topics are lower topics that are associated with the topic in the parent window. Arrow keys are used to move around. The UP and DOWN keys move up and down the

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menu. The RIGHT arrow or ENTER key select a menu item. The LEFT arrow selects the parent menu higher up in the hierarchy. The ESC key returns to the main menu from any topic, thus avoiding the student getting lost. As described earlier, ASCII file names appear in brackets, ie <FILE11 DOS>. Selecting the name in the brackets causes that topic to appear. The command line has several commands that are used:

Current:	The default, when selected, enables the arrow keys.
Go To:	Allows jumping directly to topics by topic number.
Help:	Gives definition of the arrow and function keys.
Mark:	Allows jumping to topics previously marked by F5 key.
Option:	Shows the display options, such as color.
Quit:	To leave the program.
Ref:	To jump to the REF file or index of all files.
Version:	Gives the version of PC-Hypertext.

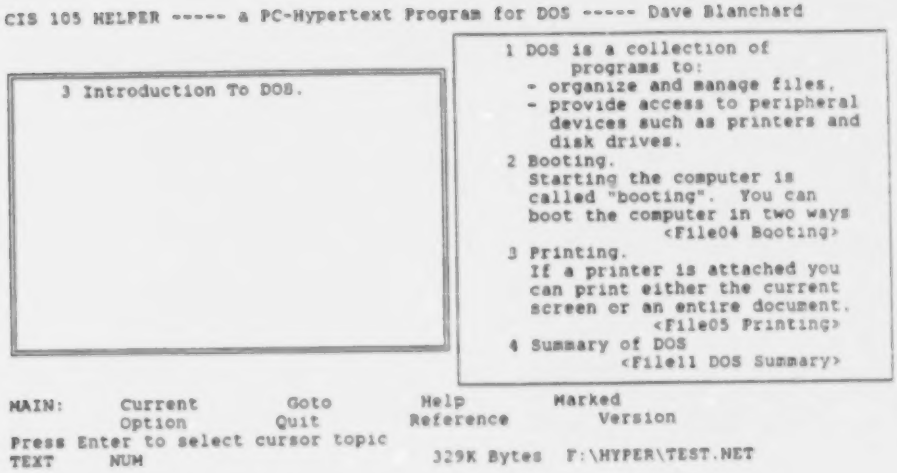
CIS 105 HELPER ----- a PC-Hypertext Program for DOS ----- Dave Blanchard
3 Introduction To DOS.
1 DOS is a collection of programs to:
- organize and manage files,
- provide access to peripheral devices such as printers and disk drives.
2 Booting.
Starting the computer is called "booting". You can boot the computer in two ways
<File04 Booting>
3 Printing.
If a printer is attached you can print either the current screen or an entire document.
<File05 Printing>
4 Summary of DOS
<File11 DOS Summary>
MAIN: Current Option
Goto Quit
Help Reference
Marked Version
Press Enter to select cursor topic
TEXT NUM
329K Bytes F:\HYPER\TEST.NET

Figure 4

CIS 105 HELPER, a Hypertext CAI
Introduction to DOS Screen

Shown in Figure 4 is the next screen that is displayed by selecting item 2, Introduction to DOS on the main menu. Note that the parent topic on the left is Introduction to DOS and the current topics on the right are as follows:

1. DOS is a collection of programs to: defines DOS briefly.
2. Booting, defining booting and offering a jump to a topic on booting to learn more.
3. Printing, describing briefly and offering a jump to learn more.
4. Summary of DOS, offering a jump to see an index of all DOS commands.

Measurement Method

To measure effectiveness of learning, a DOS proficiency test was prepared for a pretest and posttest. The DOS proficiency test, "Using the Disk Operating System", is included in Appendix G:127-128. This test was given the second meeting in the semester to measure the DOS capabilities at the start of the class. The same test was then given after eight weeks of class after the DOS material had been covered and was needed to run the application programs. A survey form was designed to measure student attitudes and opinions about the method of teaching DOS. It also asked for opinions on the value of the method of DOS teaching. The survey was given to the students after four weeks of class. The survey form, "Evaluation Questionnaire" is included in Appendix H:129-130.

Results of the survey were analyzed to measure the student reaction to the teaching method and to evaluate their opinions based on the level of experience. The first question asked was, what is your opinion of the method for teaching DOS in the lab portion of this class? The opinion responses were grouped for analysis as follows:

Satisfied:	"Impossible" or "Difficult"
Neutral:	"Useful"
Dissatisfied:	"Helpful" or "Made lab easy"

The second question asked was, what was your level of experience at the start of this course? The responses were grouped for analysis as follows:

Beginners:	"None"
Starters:	"Very little" or "Some"
Advanced:	"Quite a lot" or "Proficient"

Developmental Testing

The first phase of testing was accomplished in Spring semester, 1989 at a community college located in the same metropolitan area. The program was installed in the computer lab, and verbal instructions were given to the lab supervisor. It was too late in the semester to be included in the curriculum, however the program was used on an as-needed basis by several

students. No tests were given nor surveys conducted. Feedback was given, resulting in a slight modification of the main screen.

The next phase was accomplished in the Fall semester, 1989 at the subject community college. Approvals were obtained to install the program, insuring that no copyright laws were violated. The program was installed in the computer lab and verbal instructions were given to the teacher and the lab assistants. A handout was prepared to introduce the program, showing how to start and use the program, called CIS 105 Helper. This is included in Appendix I:131-133. The teacher passed out the handout and gave the assignment to the class to use the CAI program without a demonstration. Class 1 and Class 2 used the program as a part of CIS 105 as the sole method of learning DOS during this semester of 1989.

Feedback from this semester indicated that, although the program was easy to use and helpful, it was very difficult for the new student to get started. The beginning students, particularly complained how hard it was to get into the CAI program. The community college installed an IBM PS/2 Model 50 system in the classroom, replacing an older PC. The instructor was then able to demonstrate to the students how to start the program, and they were able to try it with his help in the classroom.

Implementation

The program was implemented during the Spring semester, 1990 on the target population, Class 3 and Class 4. Class 3 met twice weekly, Tuesday and Thursday evenings. Class 4 met once weekly on Thursday evenings. The program was unchanged from the developmental testing, except that the program, CIS Helper, was demonstrated in class. The same DOS proficiency test was given the second week of class for a pretest and then after eight weeks of class for a posttest. The same survey was used to measure opinion and experience after four weeks of class.

CHAPTER IV

Results

CAI as Learning Tool

This project was to develop and use a hypertext CAI program to teach DOS in a beginning computer course. The objective was for at least 80 percent of the class to pass a DOS proficiency test after eight weeks of class. Figure 5 shows that this objective was accomplished for all the CAI classes. Figure 6 shows the average test scores for the CAI classes was higher than for the traditional lecture/lab classes.

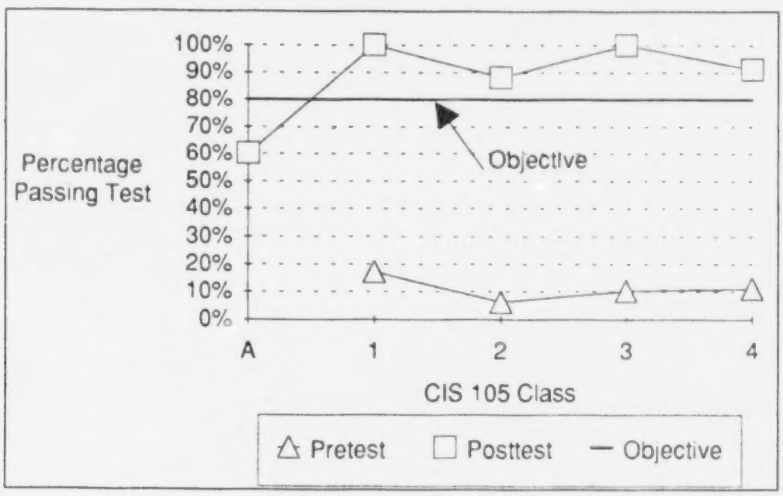

Figure 5

Survey of Computer Information Systems
DOS Proficiency Test
Comparison Test Results and Teaching Method

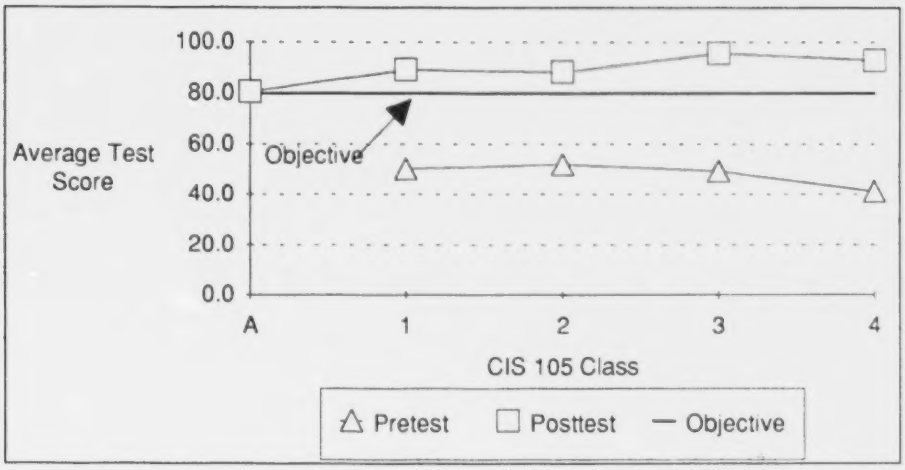

Figure 6

Survey of Computer Information Systems
DOS Proficiency Test
Comparison Test Scores and Teaching Method

The results of the DOS proficiency test taken before and after using the CAI are shown in Table 3. In Class A, using the traditional lecture/lab method to learn DOS, only 60 percent of the class achieved a grade of 80 percent or more. However, in Classes 1, 2, 3, and 4, using DOS Helper, 88 percent or more of the class achieved a grade of greater than 80 percent. In addition, the average score on the test was higher for the CAI method. A pretest was not given to Class A.

Table 2

DOS Proficiency Test
Summary of Results
All Classes

	Class A	Class 1	Class 2	Class 3	Class 4
Teaching Method	Lecture/ Lab	CAI	CAI	CAI	CAI
Handout	Yes	No	No	Yes	Yes
Demo	Yes	No	No	Yes	Yes
Time	Fall 1988	Fall 1989	Fall 1989	Spring 1990	Spring 1990
Pretest:					
Average Grade	NA	50.0	51.9	49.1	40.8
Percent Passing	NA	17%	6%	10%	11%
Posttest:					
Average Grade	80.4	89.2	88.3	95.5	92.8
Percent Passing	60%	100%	88%	100%	91%

Student Opinions

Since the student's attitude is important to effective learning, particularly with the beginning adults, it was an objective of this project to improve student's opinion of the method used to teach DOS. The objective was to have less that ten percent of the students dissatisfied with the method. Figure 7 shows that this ojective was met of Classes 3 and 4, but not Classes 1 and 2 using the CAI, nor for Class A using the standard lecture and lab method.

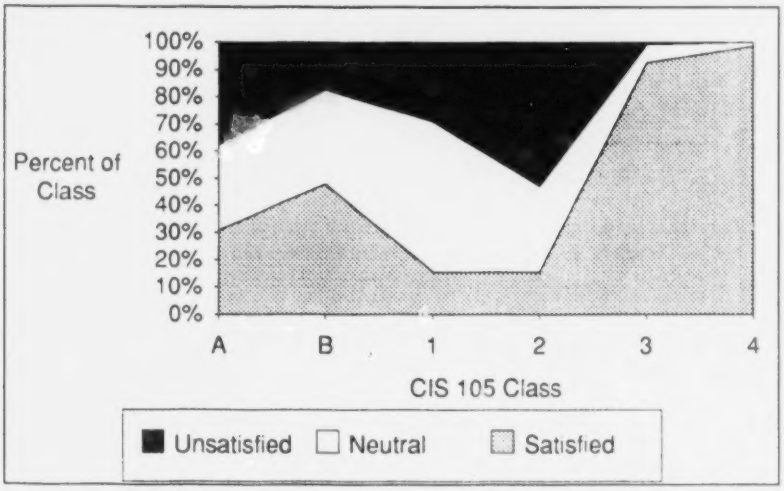

Figure 7

Survey of Computer Information Systems
Student Opinion of Method of Teaching DOS

The CAI program, CIS 105 Helper, was unchanged between Fall 1989 (Classes 1 and 2) and Spring 1990 (Classes 3 and 4). However, the teacher was able to demonstrate the CAI program to Classes 3 and 4 in class and let students try the program. This method of introducing the CAI program was felt to be a major reason for the improved student opinion. This was not possible for the other classes.

Experience and Opinion

There was another important difference between the Fall 1989 Classes 1 and 2, and the Spring 1990 Classes 3 and 4, that could account for the difference in level of satisfaction with the CAI method.

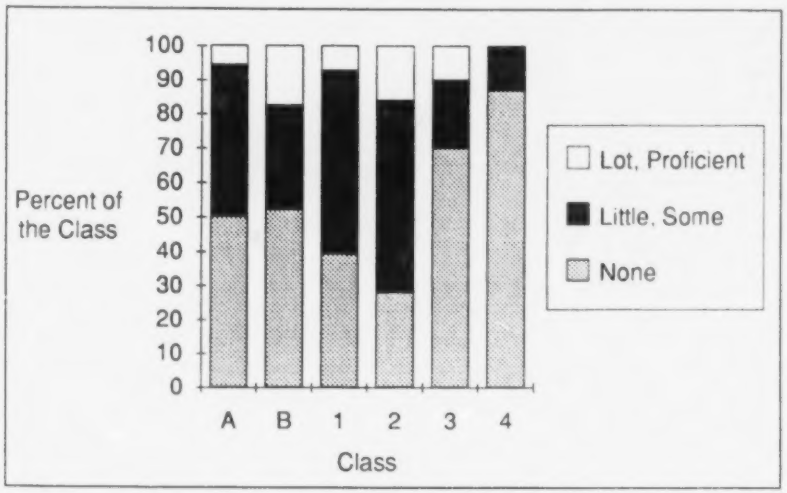

Figure 8

Survey of Computer Information Systems
Experience Level in DOS Reported in Survey

To analyze how the student's opinions related to their DOS experience, scatter diagrams were made. These are shown in Figure 9 for Classes A and B, in Figure 10 for Classes 1 and 2, and in Figure 11 for Classes 3 and 4.

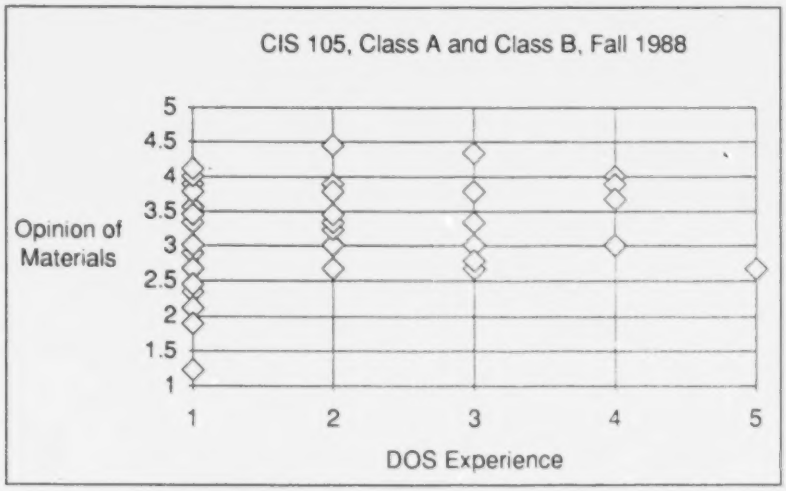

Figure 9

Survey of Computer Information Systems
Opinions vs Experience of DOS
Classes A and B

Experience Code 1 = None, 2 = A little, 3 = Some, 4 = A lot, 5 = Proficient
Opinion Code 1 = Impossible, 2 = Difficult, 3 = Useful, 4 = Helpful, 5 = Made lab easy

This diagram appears to show that beginning and experienced students had the lowest opinion of the materials used to teach these classes, using the lecture and lab method. The lecture approach results in some beginning students to be overwhelmed and experienced students to be bored.

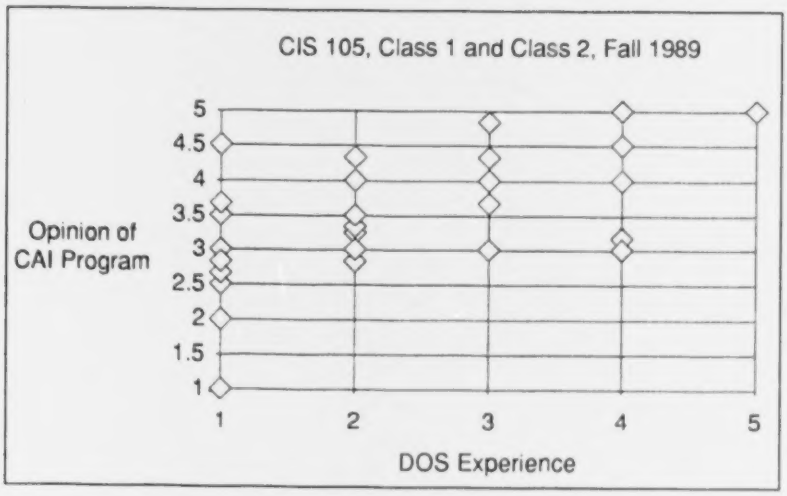

Figure 10

Survey of Computer Information Systems
Opinions vs Experience of DOS
Classes 1 and 2

Experience Code 1 = None, 2 = A little, 3 = Some, 4 = A lot, 5 =Proficient
Opinion Code 1 = Impossible, 2 = Difficult, 3 = Useful, 4 = Helpful, 5 = Made lab easy

For these classes, it appears that the more the experience, the higher the opinion. This appears to be related to the fact that the CAI program was not able to be explained to the class.

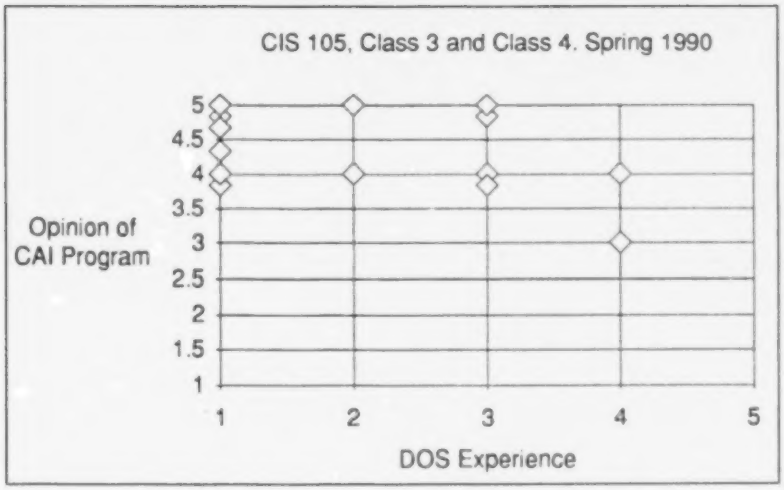

Figure 11

Survey of Computer Information Systems
Opinions vs Experience of DOS
Classes 3 and 4

Experience Code 1 = None, 2 = A little, 3 = Some, 4 = A lot, 5 = Proficient
Opinion Code 1 = Impossible, 2 = Difficult, 3 = Useful, 4 = Helpful, 5 = Made lab easy

For these classes, the opinions were fairly uniform except for one student with a lot of experience. Since the beginning students felt confident about using the CAI, they seemed to have better feelings about using it.

CHAPTER V

Recommendatio

Hypertext Computer-Assisted Instructio
teaching many subjects, but perhaps the most
teaching computer topics. At this community
program and similar programs on other topics
useful.

Expand Usage to all CIS 105 Classes

Since CIS 105 Helper is installed in th
sections of CIS 105, it is recommended that i
community college, or about 20 sections. Sev
inquired about using it next semester. At the
CIS 105 Helper can be demonstrated and the

Expand Usage to Other Local Community Co

There has been interest expressed at ot
CIS 105 is also taught. Implementation woul
college: install the program in the computer
CIS 105 faculty, and demonstrate its use. In

R V

lations

action (CAI) holds great promise for
nost important use will be in
unity college, the use of this
opics would appear to be very

in the computer lab used by all
hat it be used by all classes at this
Several teachers of CIS have
t the next CIS 105 faculty meeting,
the results obtained presented.

y Colleges

at other community colleges where
would be the same as at this
uter lab, present the results to the
In addition a training session

should be conducted for all lab assistants to make them familiar with the use and scope of the program.

Expand Usage to Other CIS Courses

Since the computer lab is an open lab, meaning students taking classes in all subjects, there are many times when a beginning student comes into the lab and has no idea where to begin. Currently, lab assistants and teachers individually tutor the student in the use of DOS and how to get started. It is recommended that beginning students use this CAI to learn DOS to relieve the heavy tutoring.

Improvements to the DOS Course

It is recommended that the program be improved in the following ways:

1. Include a test in the CAI program. As each student completes the course, they would take a test on DOS. This would provide immediate feedback to the student that they had learned the material and reinforce what they had learned. If they passed the test, they could start learning one of the application software programs. Since the test would be conducted during the CAI, classroom time would not be needed to administer the DOS proficiency test.

2. Include a glossary of terms for general data processing used in this course in addition to the DOS terms. The most difficult part of learning about computers is knowing and understanding all the special terms relating to computers. A glossary would help the beginner and serve as a reference for the intermediate student.
3. Include a "guided tour" of parts of the program to give an example to show how it works. A hypertext program can be intimidating to the new user since there is less structure that the student is used to. A guided tour is a structured tutorial introduction to the material in the course, showing how to move around the subject matter at the same time.

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APPENDICES

APPENDIX A

CIS 105 Supplement: Disks and DOS

CIS 105 SUPPLEMENT: DISKS and DOS

Tom Trollen and Jerry Booher
Community College

INTRODUCTION

This supplement deals with two topics which are not treated in detail by the Warner/Werrner lab manual: (1) disks and (2) DOS.

DISKS

Disks are used to permanently store programs and data files. Two types of disks dominate the personal computer market today: floppy disks and hard disks.

Floppy disks come in a variety of sizes (8", 5 1/4", 3 1/2") and are removable, making it easy to share data. Hard disks are generally permanently mounted inside the computer's system unit, which is why they are also known as fixed disks. Although they are not portable, hard disks transfer data (read and write) faster than do floppy disks and offer much larger storage capacity.

The PS/2 Model 50 systems you'll be using have a 3 1/2" disk drive known as A:, and a hard disk designated as C:. When you do your homework, drive A: will always contain one of your data disks. Drive C: contains the software (programs) you'll need to use.

Figure 1 depicts a 3 1/2" microdisk. Underneath the shutter is the read/write slot, an opening through which the disk drive accesses the disk. The write protect switch acts as a "safety"; when it is open, information cannot be written onto the disk. Information can only be written onto the disk when the switch is closed. You will purchase two such disks for storing your work this semester.

A PS/2 3 1/2" disk can hold over 1.4 million characters of information; however, each diskette must be formatted before it can be used for storage. The following activities occur when a diskette is formatted:

- prior contents (if any) are erased
- tracks are established
- sectors are established
- a directory track is established

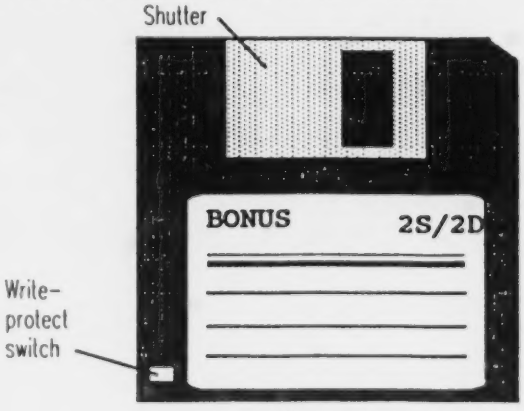


Figure 1

Figure 2 represents a formatted 3 1/2" disk. It has 80 tracks which are concentric recording positions similar to the grooves on a record album except that they're invisible. Each track is divided into 18 sectors. Each sector is capable of holding 512 bytes (a computer term for characters). In total, all of the sectors of all of the tracks on both of the sides are capable of holding 1,457,664 characters.

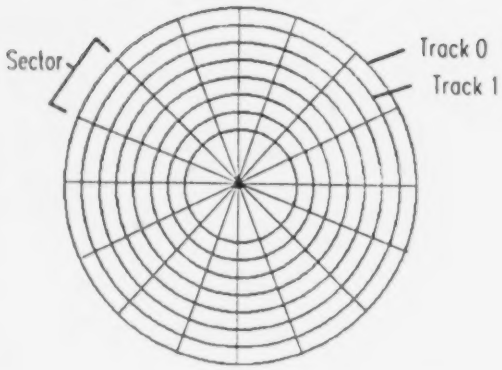


Figure 2

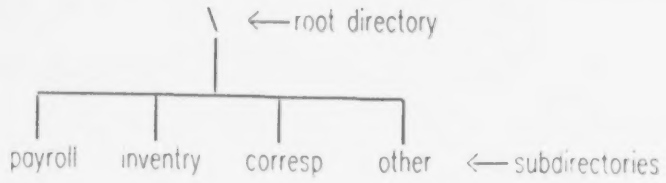
Diskettes must be formatted so the PS/2 can keep track of where on the diskette the information has been written. Suppose a file is saved to the disk on sectors 7, 8, and 9 on track 14. Not only is the information itself saved to disk, but an entry is made in the directory track indicating the name of the file and its location on the disk (cited in tracks and sectors).

Later, when an attempt is made to retrieve the file, the PS/2 must be able to find the file. This is accomplished by looking in the directory track for the name of the file and, if found, for the tracks and sectors the file occupies.

Recall that hard disks have a much larger storage capacity than floppy disks. Hard disks come in many sizes, 20 megabytes (million characters), 30 megabytes and some exceed 100 megabytes. However, to efficiently use that much storage capacity requires the use of subdirectories.

Imagine a business that has 30 payroll data files, 20 inventory files, and 150 other files which contain a variety of important correspondence (reports and letters). These 200 files could easily be stored on a hard disk; however, singling out one of this big group of 200 files would be somewhat inconvenient.

Subdirectories allow related files to be stored together. For example, the business above might choose to create separate subdirectories to hold the PAYROLL, INVENTORY and CORRESPONDENCE files as 3 different groups. In this case, all 200 files would be stored on the hard disk but retrieval would be easier since the files are separated into smaller, logically related groups. The logical organization of the files on this disk can be represented by a tree:



To retrieve one of the 20 inventory files would involve going to the inventory subdirectory and selecting from among those 20. Without a subdirectory structure, the selection would be made from a group of 200 files!

DOS

Before you can use a computer, a **disk operating system (DOS)** must be loaded into its memory. Think of DOS as a set of programs and commands to manage files stored on disks and control the operation of the system's hardware.

The process of loading DOS into the memory of the computer is called **booting**. Powering up is called a **cold boot**. Occasionally, you'll need to restart after doing some work. Instead of switching the power off, you can hold down the CTRL and ALT keys while pressing the DEL key, which is called a **warm boot**. This has the same effect as turning the power off and on.

Selected DOS commands and their meanings are listed below:

command	issued to get the computer to:
DIR	display the name, size, date and time of files on a disk or subdirectory.
FORMAT	put tracks, sectors and a directory track on the disk so that data can later be stored.
CHKDSK	display information about computer memory and disk usage.
COPY	copy a file from one disk (or subdirectory) to another.
ERASE	erases (deletes) a file from the disk.
CD	change from one subdirectory to another.

The commands listed above represent only a small portion of those available in PC DOS. In addition to the command, we will usually need to type the complete name of a file, which is called a **file specification**. A file specification has the format:

d:\subdirectory\filename.ext

where **d:** represents a disk drive (A: or C: for our purposes)
\subdirectory denotes the subdirectory the file is in
filename is the name of the file (8 characters maximum)
.ext represents a 3-character extension

Extensions are used to indicate the type of file; common extensions include .DAT, .TXT, .BAT, and .EXE (data, text, batch and executable program). Filenames and extensions may consist of alphabetic characters and numbers. Do not use special characters such as @#$%&{}[]. Filenames should be chosen so that they help describe what the file contains. For example, a file containing class grades on May 15 might be called GRADE515.DAT. Some other sample filespecs:

A:MEMO.DAT C:\VP\VP.EXE A:GRADE515.DAT C:\WP\LETTER.DOC

DOS commands may be typed in either upper or lower case. These commands are illustrated in the following exercise.

DOS EXERCISE

Objectives:
1. Format your blank diskettes.
2. Become familiar with selected DOS commands.

When performing this and all other exercises be sure you understand WHAT you're doing and WHY you're doing it. Don't be a button pusher!

As you saw in the operations video, when a PS/2 is powered up, a self check of circuits is performed. If the check is successful, the A: drive automatically comes on in an attempt to load DOS. If DOS is not available on the A: drive, an attempt is made to load DOS from the hard disk (C: drive). DOS must be in memory controlling the entire system anytime the PS/2 is used.

STEP:

0: Prepare paper labels containing your name, CIS 105 DATA DISK and your instructor's name. Attach one to each data disk.

1: Turn on the power to the system unit (or perform a warm boot if the computer is on). After a moment of disk activity, you'll see a WELCOME screen displayed. Read the screen carefully, then press RETURN. Below the message you should see:

C:\>

This is called the DOS prompt. It indicates three things:

- that DOS has loaded and is awaiting your command.
- that drive C: is the default drive and will be used if a drive is not specified in a command.
- that the root directory (\) is the default directory and will be used if a subdirectory is not specified.

2: To see the name and size of everything stored in this root directory, type:

C:\>DIR

There will be 5 columns in the directory listing. They indicate the name and extension of the file or subdirectory, the size (in bytes) of the file, and the date and time the file was last modified. The PS/2 system has a battery operated clock/calendar which maintains the current time and date.

Among the entries in this listing are the two subdirectories you'll be using during this DOS exercise. They are:

```
DOS       <DIR>
105DATA   <DIR>
```

3: Notice the DOS prompt. The C:\> indicates that you are currently in the root directory of drive C:. The 105DATA subdirectory contains many files which you'll be using during the semester. To obtain a list of these files type:

```
C:\>DIR\105DATA
```

This command explicitly asked for a listing of what is in the \105DATA subdirectory. Notice that the command in step 2 did not explicitly indicate what subdirectory was desired, so the default subdirectory was used.

4: Change to the DOS subdirectory. Type:

```
C:\>CD\DOS
```

Notice that the prompt changes to:

C:\DOS> indicating that you're in that subdirectory.

5: Obtain a list of what is in this subdirectory by typing:

```
C:\DOS>DIR
```

Since no drive or subdirectory was stated after the DIR command, the default subdirectory \DOS was used.

6: Now, insert one of your new disks into drive A: so it can be formatted. To begin, key in:

```
C:\DOS>format a:/v
```

This command tells the PS/2 to format the diskette in drive A: and the /v parameter (part of the command) will cause the system to ask you to enter a volume label. You're being asked to give this disk a label which is stored in the directory track. Use your name as a volume label so if someone finds your disk, the volume label will indicate that it belongs to you. Note: volume labels cannot exceed 11 characters.

This format process will take a few minutes. Be sure to pay attention to the screen for messages. Near the end you'll see something like:

```
Format Complete
Volume label (11 characters, ENTER for none)?JERRYBOOHER
1457664 bytes total disk space
1457664 bytes available on disk
Format another (y/n)?
```

7: Your response to this prompt will be "y" since you have another diskette to format. You will be prompted to insert into drive A: the next disk to format and strike a key when ready.

After the second disk has been formatted you'll be asked if another is to be formatted. Type "n".

8: Now, check that the disk in drive A: has been formatted:

```
C:\DOS>DIR A:
```

Notice the volume label and the message indicating that there are no files on your disk (yet).

9: Now, see what happens with the CHKDSK command. As used below, the /F parameter tells DOS to try to fix any bad entries in the directory track.

```
C:\DOS>CHKDSK A: /F
```

You'll see something like:

```
1457664 bytes total disk space
1457664 bytes available on disk
654336 bytes total memory
514176 bytes free
```

10: The PS/2 has another feature we will introduce now. Occasionally you'll find it advantageous to obtain a paper copy of whatever is on the screen, called a **screen dump**, by striking the **Print Screen** key (which is in the top row above the cursor control keys).

Be sure the printer is on and that the printer switch box is set for your PS/2. Obtain a screen dump and be prepared to turn it in. In the future, if you have trouble with a particular command, obtain a screen dump and bring it to your instructor so they can see what you typed and what the computer's response was.

11. To change back to the root directory, type:

```
C:\DOS>CD\
C:\>
```

Recall that one of the subdirectories was \105DATA and that it contained many files that you'll use during the semester. In the next few steps, you'll copy these files onto your disks.

12: Change to that subdirectory:

C:\>CD\105DATA

13: Obtain a listing of its contents:

C:\105DATA>DIR

Note that one of the files in this subdirectory is SALES.WKS. Realize that C:\105DATA\SALES.WKS is the complete filespec.

14: The general format for the COPY command is:

COPY filespec1 filespec2

where filespec1 is the file to copy (source)
filespec2 is the destination file (target)

To make a copy onto your data disk you COULD type:

C:\105DATA>COPY C:\105DATA\SALES.WKS A:SALES.WKS

However, use the following line to achieve the same result.

C:\105DATA>COPY SALES.WKS A:

Notice in the abbreviated command that the source filespec did not mention a subdirectory, so the default subdirectory (\105DATA) was used. Also, notice that the destination filespec mentioned neither a subdirectory nor a filename. Since your disk in drive A: has no subdirectories, the root directory was used. The file received the name SALES.WKS, the same name as the source file.

After a moment of disk operation, you'll see a message like:

1 File(s) copied.

15: If you wanted to copy SALES.WKS to the new disk and call it something else, like JUNK.WKS, type:

C:\105DATA>COPY SALES.WKS A:JUNK.WKS

16: To verify that the file was copied to drive A: twice (though under different names), key in:

C:\105DATA>dir a: Were they there?

17: The general format for the ERASE command is:

ERASE filespec

Since you don't really want the copy called JUNK.WKS on your disk, erase it by typing:

C:\105DATA>erase a:junk.wks

Verify that it was erased by obtaining another directory listing of the A: drive. Is it gone? At this point you should have only the file SALES.WKS on your disk.

18: Next, erase SALES.WKS from your disk. Type:

C:\105DATA>erase a:sales.wks

19: To make copies of all of the files in the \105DATA subdirectory we could use the COPY command once for each file, but that would be tedious. Let's make DOS do all the work! To get all of the files in the \105DATA subdirectory copied onto drive A: type:

What would happen if you forgot the a: in the erase command above? (Answer: the default drive and directory C:\105DATA\ would have been used. Your command would have erased SALES.WKS from the hard disk! To prevent an accidental erasure of this file, one that all CIS 105 students need for this DOS exercise , we have designated this file as READ ONLY.)

C:\105DATA>copy *.* a:

The * is called a **wild card** and, in this context, tells DOS to copy every file, regardless of the extension, to drive A: and give them the same name as they have on the source file. Watch DOS do it all for you! After a few minutes you'll have a duplicate of each file.

20: Obtain a directory listing of drive A: to be sure that you have your own copy of these files. Produce a screen dump.

21: Now, you have a copy of all of these files on one of your disks. But what if something happened to this disk? What would it take to make a copy of these files onto your second data disk? Having copies of valuable files on multiple disks is called backup.

Remove from drive A: your data disk and replace it with your other data disk. Type:

C:\105DATA>copy *.* a:

Obtain a directory listing to ensure that you have backups!

22: YOU'RE DONE! Remove your disk from drive A:. DO NOT TURN OFF THE POWER; the next user will perform a warm boot.

Be prepared to turn in your screen dumps from steps 10 and 20. For this and all other assignments, please tear off the tractor feed strips and write your name, class time and assignment number in the upper right-hand corner of each printout.

QUESTIONS

Use what you learned in the exercise above to answer these questions on a piece of your own paper. Be prepared to turn it in. These questions are not hands-on exercises.

A) What does the term boot mean?

B) What happens internally when a boot is performed?

C) What keys are required to perform a warm boot?

D) Why must drive A: be empty when you boot a PS/2?

For each of the following questions, indicate a DOS command to achieve the desired result:

E) Format the disk in the A: drive.
C:\>

F) Copy a file called VALUABLE.DAT from the A: drive to the FILES subdirectory on drive C:.
C:\>

G) Delete the file VALUABLE.DAT from the A: drive.
C:\>

H) Delete file VALUABLE.DAT from the FILES subdirectory on C:.
C:\>

I) Change the default subdirectory to \MEMOS
C:\>

J) Change the default subdirectory to the root directory:
C:\MEMOS>

K) Change the default drive to drive A:
C:\105DATA>

L) Get a list of the files in the FILES subdirectory:
C:\>

M) Copy the file TREE.COM from the DOS subdirectory on the hard disk to the diskette drive:
C:\>

N) If \DOS was the default directory, show how your answer to question M could be shorter.
C:\DOS>

O) Copy all the files that begin with the letter D from the DOS subdirectory on the hard disk to the diskette drive:
C:\>

APPENDIX B

CIS 105 Supplement: Disks and DOS, Questionnaire
Classes A and B

CIS 105 - Survey of Computer Information Systems
CIS 105 Supplement: Disks and DOS
Evaluation Questionnaire

1. Please circle your level of experience before taking this class in the following microcomputer applications:

	None	Very Little	Some	Quite a Lot	Proficient
Using a computer:	1	2	3	4	5
DOS:	1	2	3	4	5
Data Base in general:	1	2	3	4	5
dBASE III Knowledge:	1	2	3	4	5

2. Please circle your opinion of the supplemental materials for operation of the PS/2's, DOS, and dBASE III, used in the lab portion of this class:

	Impossible	Difficult	Useful	Helpful	Made lab easy
Easy to follow	1	2	3	4	5
Terms well defined	1	2	3	4	5
Format easy to use	1	2	3	4	5
Tied in with Warner/Wermer	1	2	3	4	5
Value as reference later	1	2	3	4	5
Value as learning tool	1	2	3	4	5
Covered all the material	1	2	3	4	5
Time required to complete	1	2	3	4	5
Need for help from Lab Assistants	1	2	3	4	5

Suggestions: On the reverse side, please offer suggestions for improvements.

APPENDIX C

CIS 105 HELPER
Program Outline

1. Main Menu
   CIS 105 HELPER - A PC-Hypertext Program for DOS
   ==========
   CIS 105 HELPER
   Using PC-Hypertext
   ==========

2. New User Guide
   CIS 105 HELPER
   ==========
   Press ENTER or RIGHT-ARROW
   KEY on this topic for
   a short guide to using the
   CIS 105 HELPER <file000>.
   Otherwise, press ARROW keys to
   select topics to help you with
   CIS 105.
   ==========

3. Introduction TO DOS.

   A. DOS is a collection of programs to organize and manage files, and provide access to peripheral devices such as printers and disk drives.

      DOS can:
      a. Display names and change names of files
      b. Copy files
      c. Erase files
      d. Display contents of files
      e. Start programs stored in files

         1. Command Intrepreter

         2. Prompt

   B. "Booting" is the starting of a computer. You can boot the computer in two ways:

   C. Printing

   D. Summary

4. Files and File Names

5. Disks and Diskettes

   A. Floppy Diskettes

   B. Hard Disks

      1. Subdirectories

C. CIS 105 Usage

1. WordPerfect

2. VP-Planner

3. dBASE

6. Commands

A. Directory Command

1. Current Directory

B. Check Disk Command

C. Format Command

D. Rename Command

E. Copy Command

F. Erase Command

G. Type Command

H. Change Directory Command

1. Current Drive

APPENDIX D

CIS 105 HELPER
Reference File

Reference File

This REFERENCE FILE provides alternate ways to access information in a hypertext system. You may jump to any topic by highlighting that file and pressing the RIGHT ARROW. There are two listings -- first in alphabetic order, then in sequence by "Filexx".

<FILE00> USER GUIDE -- How to get started

Alphabetical listing of the files on this disk

<FILE04> Booting
<FILE19> CHANGE DIRECTORY Command (CD)
<FILE13> CHECK DISK Command (CHKDSK)
<FILE02> CIS 105 Usage
<FILE06> Command Intrepreter
<FILE16> COPY Command (COPY)
<FILE21> Current Drive
<FILE25> dBASE III Plus Usage
<FILE12> DIRECTORY Command (DIR)

REF MORE

Reference File (Continued)

<FILE01>	Disk Drives
<FILE11>	DOS Summary
<FILE17>	ERASE Command (ERASE)
<FILE10>	Files
<FILE03>	Floppy Disks
<FILE14>	FORMAT Command (FORMAT)
<FILE09>	Hard Drives
<FILE05>	Printing
<FILE07>	Prompt
<FILE15>	RENAME Command (REN)
<FILE22>	Single Density Diskettes
<FILE20>	Starting Programs
<FILE08>	Subdirectories
<FILE18>	TYPE Command (TYPE)
<FILE24>	VP Planner Usage
<FILE23>	WordPerfect Usage

REF MORE

Listing of the files on this disk in "Filexx" Sequence

```
<FILE00>      USER GUIDE -- How to get started
<FILE01>      Disk Drives
<FILE02>      CIS 105 Usage
<FILE03>      Floppy Disks
<FILE04>      Booting
<FILE05>      Printing
<FILE06>      Command Intrepreter
<FILE07>      Prompt
<FILE08>      Subdirectories
<FILE09>      Hard Drives
<FILE10>      Files
<FILE11>      DOS Summary
<FILE12>      DIRECTORY Command (DIR)
<FILE13>      CHECK DISK Command (CHKDSK)
<FILE14>      FORMAT Command (FORMAT)
```

REF MORE

Reference File (Continued)

<FILE15>	RENAME Command (REN)
<FILE16>	COPY Command (COPY)
<FILE17>	ERASE Command (ERASE)
<FILE18>	TYPE Command (TYPE)
<FILE19>	CHANGE DIRECTORY Command (CD)
<FILE20>	Starting Programs
<FILE21>	Current Drive
<FILE22>	Single Density Diskettes
<FILE23>	WordPerfect Usage
<FILE24>	VP Planner Usage
<FILE25>	dBASE III Plus Usage

<REF> Listing of the files on the disk (called by REF command)

APPENDIX E

CIS 105 HELPER
Nodes, ASCII Files

How to use PC-Hypertext

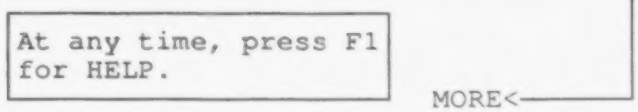
PC-Hypertext is a hypertext system allowing users to browse through networks of information in different ways. It is up to you. You can do either of the following:

1. FOLLOW THE MENU IN A "LINEAR" FASHION. That is, start at the first topic, then read the second, and so forth.

OR

2. GO TO THE TOPICS THAT INTEREST YOU. Read the topics and then go to those you are interested in or want to learn.

If you see the word, "MORE" at the bottom of the screen, you can see the next page by using the "PAGE DOWN" key.



File00 MORE<

How to use PC-Hypertext (Continued)

If you see another topic with a reference in angle brackets, you can "jump" directly to that topic. PC-Hypertext will remember where you came from. You can retrace your steps by pressing the LEFT ARROW key.

To select angle-brackets for jumping:

Up/Down Arrows -- Move a text highlighter to the next or previous cross-reference by use of the UP or DOWN ARROW keys. Press ENTER or RIGHT ARROW to jump to that topic. Press LEFT ARROW to return to the previous file.

If you push a key and hear a "BEEP", there is no information in that direction.

<File11 DOS Introduction> <——(Try using the ARROW DOWN key to move here)

If you get lost, press LEFT ARROW to return to the Main Menu.

File00 MORE

You may make a printed copy of the information contained in this PC-Hypertext data base. There are two ways:

TO PRINT ONE SCREEN:

While displaying the screen you want to print, press the PRINT SCREEN key. All information on the screen will print.

TO PRINT ONE OR MORE FILES:

While displaying a "FileXX", as shown in the lower left corner of the screen, press the PF5 key to mark this file. Then return to the Main Menu (by pressing ESC key) and press the letter "M" to display the files marked. Press the letter "P" to print. You may select several files in this way and print them all at once. You may delete files from this list by moving the pointer to the item and pressing the DELETE key.

File00

DISKS

Disks are used to permanently store programs and data files. There are two types of disks that are used most often with the personal computer today. They are the following:

<File03 Floppy Disks> <——— Floppy disks

Floppy disks come in a variety of sizes (8", 5.25", 3.5") and are removable, making it easier to use the same data on different personal computers.

<File09 Hard Disks> <——— Hard Disks

Hard disks, also called fixed disks (since they are not removable), are permanently mounted inside the computer system unit. Although they cannot be moved from computer to computer, they transfer data (read and write) faster than floppy disks and offer much more storage capacity. CIS 105 classes use the IBM PS/2 Model 50 systems.

<File02 CIS 105 Usage>
File01

CIS 105 Disk Usage

You should purchase two 3.5" floppy diskettes for CIS 105 lab use. One will be used for data and the other for backup of your data.

The Warrner/Werner lab manual assumes that you'll be working with systems that have two floppy disk drives. CIS 105 classes use the IBM PS/2 Model 50 systems. These have one 3.5" floppy disk drive known as drive A: and one hard disk designated as drive C:. When you do your homework, you will use drive A: and your own floppy disk for data, and the software programs you will learn and use will be permanently installed on drive C:.

To learn how to access software on the Model 50 in the subdirectories, select the software you want:

<File23 WordPerfect>
<File24 VP Planner>
<file25 dBASE III Plus>

FILE02

FLOPPY DISKETTES

The 3.5" FLOPPY DISKETTE is used on the PS/2 to store data. The diskette consists of a hard plastic shell for protection and a circular mylar plastic disk coated with iron oxide to magnetically record data. The disk rotates inside the shell, and data is read by the diskette drive in the PS/2.

The shell contains a shutter that is moved out of the way when inserted in the diskette drive to expose a opening that the disk drive accesses the disk. This shutter should remain closed to keep the diskette clean.

The shell also contains a small square (approximately 1/8") hole with a cover that acts as a "write protect" switch. This works as a safety to provide a physical means of preventing data from being written onto the disk.

> When the switch is CLOSED and the hole is covered, the disk drive CAN WRITE data onto the diskette.

The 3.5" diskette can hold 1.4 million bytes (characters) of data. However each brand new diskette must be formatted before it can be used.

Formatting is used to divide up the disk surface into 80 circular tracks around the disk. Each track is divided into 18 sectors, and each of these sectors contains 512 bytes. These tracks and cylinders are used to locate data by going to an "address" consisting of the track and the cylinder. In this way data can be read or written without searching over the whole disk to find it. A "directory" is written in the same place on all disks and serves as the locator of all files on the disk.

When formatting is done, the following occurs:

1. Prior contents (if any) are destroyed.
2. The tracks are established.
3. The sectors are established.
4. A directory track is established.

<file14 Format Command> <---- See this for Formatting information.
File03

BOOTING or REBOOTING the System

The process of starting a computer is called "booting". You can boot the computer in either of two ways:

COLD BOOT: Turn off power (if on), wait 30 seconds, and turn the power on. The computer must have a hard drive with DOS installed or with a floppy disk with DOS in drive A:.

WARM BOOT: With the power on, press the CTL key, the ALT key, and the DELETE keys all at the same time. This is the much preferred method if power is on.

BEFORE YOU START USING THE COMPUTER FOR YOUR EXERCISES YOU SHOULD DO A WARM BOOT TO ENSURE ALL THE PROPER FILES ARE AVAILABLE.

File 04

Printing

If you have a printer attached, you can use it to print out reports, lists, or write payroll checks on forms.

PRINTING CONTENTS OF THE SCREEN

You can print exactly what is on the screen on the printer by pressing the "PRINT SCREEN" key. If your computer keyboard does not have this key, you can press two keys at once to print the screen. Press the SHIFT key and the PRTSC key at the same time.

PRINTING EVERYTHING THAT APPEARS ON THE SCREEN

This is often referred to as operating as a "console". Press the CTRL key and the PRINT SCREEN key the same time to turn on the printer. The printer will then print everything that displays on the screen. To turn off the printing, press the CTRL key and the PRINT SCREEN key again. This is useful to record all that goes on while you are performing a critical function, such as installing a new software package.

PRINTING REPORTS IS CONTROLLED BY THE APPLICATION PROGRAM FILE05

THE COMMAND INTERPRETER

The COMMAND INTERPRETER is the program in DOS that helps you control DOS. As you type commands at the prompt they are displayed on the screen. When you press the ENTER key, DOS tries to execute your command.

Select to see what a prompt looks like.————> <File07 Prompt>

For instance, here are three simple commands:

DATE: When executed, displays the current date, then asks for you to enter a new date. Press ENTER to keep the same date.

```
A:>date
Current date is Mon 1-23-1989
Enter new date (mm-dd-yy):_
```

<DATE> <----------Select here to see it work.
Press ENTER to keep the same date.

Another similar command is

TIME: When executed, displays the current time, then asks for you to enter a new time. Press ENTER to keep the same time.

```
A:>time
Current time is 10:45:06.10
Enter new time:_
```

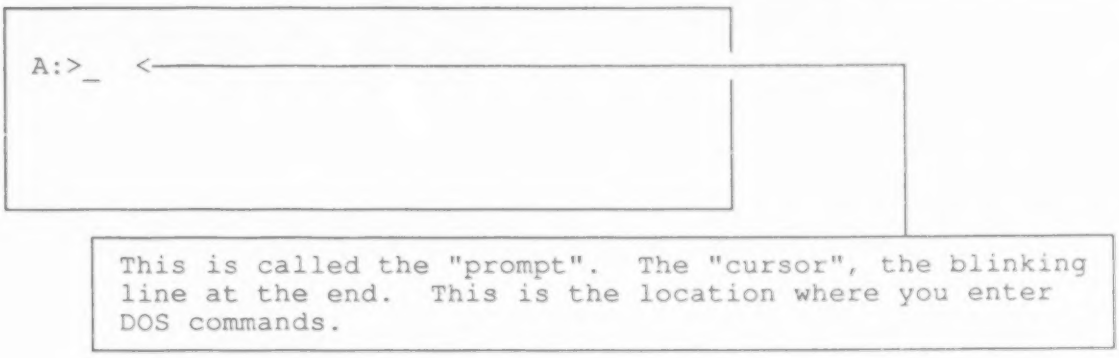
If the command is misspelled or is not a valid command, DOS will give an error message.

```
A:>speak
Bad command or file name
```

If you get this message, check the spelling of your command.

FILE06

The DOS Prompt

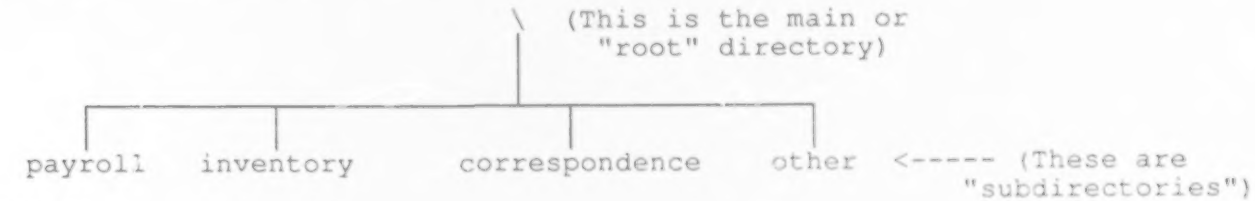


FILE07

Subdirectories

Subdirectories allow large disk drives to store files grouped by application or use to be able to find them without scanning the entire disk. Subdirectories allow related files to be stored together like chapters in a book. For example, a business with 200 files might choose to create separate subdirectories to hold the PAYROLL, INVENTORY, and CORRESPONDENCE files as three different groups.

In this example, all 200 files would be stored on the hard disk, but retrieval would be easier since the files are separated into smaller, logically related groups. The logical organization of the files on this disk can be represented by a tree:



File08

Hard Drives

HARD DISK DRIVES have a much larger storage capacity than floppy disks. Hard disks come in many sizes:

- 20 megabytes (million characters),
- 30 megabytes (the capacity of the PS/2 Model 50), and
- over 100 megabytes.

This is a lot of storage space available to store large amounts of data. Since this space is so large, we need a way to manage that space so that we can easily find files containing the data we need for a particular program.

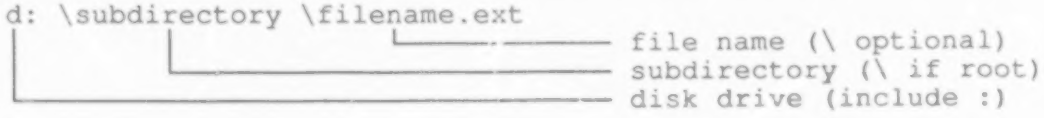
Imagine a business that has 30 payroll data files, 20 inventory files, and 150 other files which contain a variety of important correspondence (reports and letters). These 200 files could easily be stored on a hard disk; however singling out one of this big group of 200 files would be very difficult and time-consuming.

To solve this problem, DOS, starting with Release 2.0, included a system, called SUBDIRECTORIES.

<file08 Subdirectories> <---------- Select for more infomation.
File09

FILE NAMES (Continued)

To complete the FILE SPECIFICATION, we need to add the disk drive (floppy or hard) that the file is on and the subdirectory is on (if there is one). To summarize, the format for a file specification is



Some examples are as follows:

a:\grades.dat	Class grades (data) in root directory.
c:\lotus\123.bat	Batch file in lotus directory on c:.
b:\wp\memo.txt	A memo (text) in the WordPerfect sub directory.

All file names, like all DOS Commands may be typed in either UPPER CASE or lower case. DOS will display them in upper case.

FILE10

FILES

FILE are collections of related records, such as the "customer file" in a business. It would contain a record for each customer with pertinate information for that customer. These records would be contained together in a FILE. In addition to containing data like the customer file, they may also be test (letters) or programs.

FILE NAMES

Each file has a unique name called a FILE SPECIFICATION to the system, just as people have names which should be meaningful. The file specification consists of two parts: The FILENAME and the EXTENSION. The format is FILENAME.EXT, with the two parts separated by a period. The filename contains up to 8 characters and the extension contains up to 3.

These characters can include the following:

Letters of the alphabet
Numbers 0,1,2,3,4,5,6,7,8,9
Special characters $#&@!%()-{}_
(Note: use of these should be avoided)

Summary of DOS

Before you can use a computer, a program must be loaded into memory to provide the instructions to perform the task that you wish to perform, such as run a payroll and write the checks. The first program that must be loaded in the Microcomputer is the "Disk Operating System", or DOS for short.

DOS is a collection of programs to:

1. organize and manage files
2. provide access to peripheral devices (printers, disks, etc.)

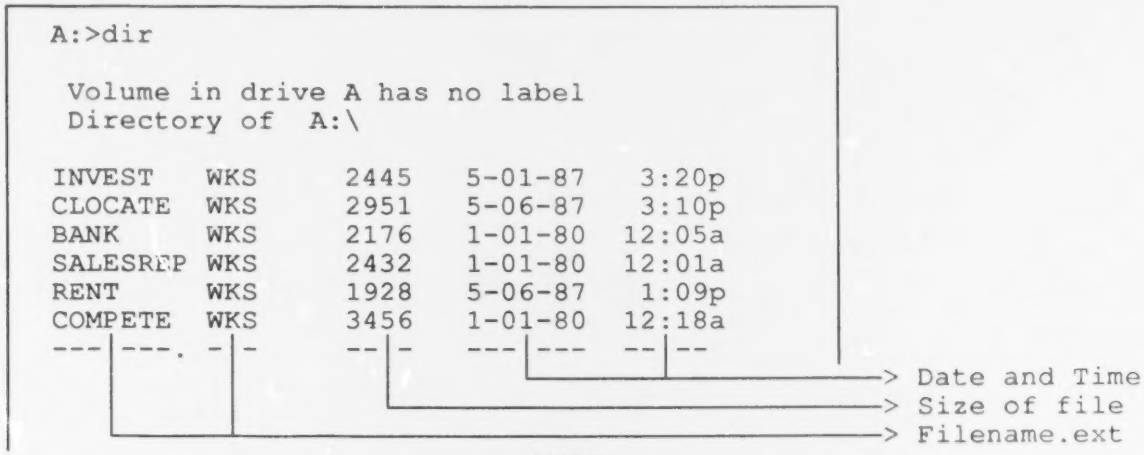
DOS provides programs to:

1. Display names of files	<File12 DIR Command>
2. Display information about disks	<File13 CHKDSK Command>
3. Prepare blank diskettes for use	<File14 FORMAT Command>
4. Change names of files	<File15 REN Command>
5. Copy files	<File16 COPY Command>
6. Erase files	<File17 ERASE Command>
7. Display contents of files	<File18 TYPE Command>
8. Change subdirectories	<File19 CD Command>
8. Start programs stored in files	<File20 Starting Programs>

FILE11----->SELECT THE DIR COMMAND TO START LEARNING THE COMMANDS <-------

The DIR Command

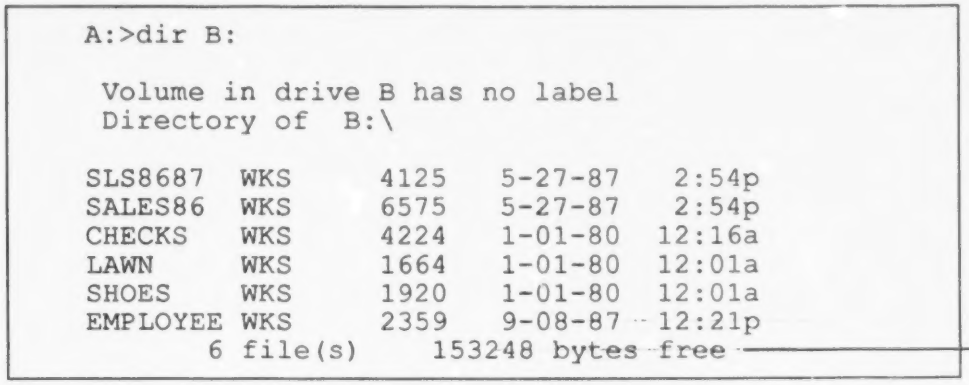
The Directory Command, or simply the DIR Command reads the file directory stored on the floppy diskette or hard disk and tells you which files are stored there, the size of the files, the date and time created. For example:


A:>dir
Volume in drive A has no label
Directory of A:\
INVEST WKS 2445 5-01-87 3:20p
CLOCATE WKS 2951 5-06-87 3:10p
BANK WKS 2176 1-01-80 12:05a
SALESREP WKS 2432 1-01-80 12:01a
RENT WKS 1928 5-06-87 1:09p
COMPETE WKS 3456 1-01-80 12:18a
Date and Time
Size of file
Filename.ext

The DIR Command (Continued)

The DIR Command issued by typing "dir" at the prompt. It will display the list of files in the current directory.
<File21 Current Directory>

You can see the directory for a disk in another drive or directory by using the drive letter (including the colon).


A:>dir B:
Volume in drive B has no label
Directory of B:\
SLS8687 WKS 4125 5-27-87 2:54p
SALES86 WKS 6575 5-27-87 2:54p
CHECKS WKS 4224 1-01-80 12:16a
LAWN WKS 1664 1-01-80 12:01a
SHOES WKS 1920 1-01-80 12:01a
EMPLOYEE WKS 2359 9-08-87 12:21p
6 file(s) 153248 bytes free
Summary

FILE12 MORE

The DIR Command (Continued)

You can limit your selection of files by using a "wild card", as the asterisk (*) is called. In the DIR command and some others, you can use wild cards to apply the command to several files at once. When you use an * in a filename or in an extension, it means that any character or characters can be in that position.

For example,

```
B:>dir a:*.wks

Volume in drive A has no label
Directory of A:\

INVEST   WKS      2445   5-01-87   3:20p
CUSTMAST WKS     13370   5-01-87  11:05a
CLOCATE  WKS      2951   5-06-87   3:10p
     3 File(s)         60416 bytes free
```

The result is to show all files on drive A: that have the extension of "wks".

Type "/p" after the DIR command and DOS pauses after filling the screen.
Try one? We'll do "DIR file0*.*" for you ——————> <directory>

The DIR Command (Continued)

Other examples:

The DIR Command	Would result in
A:>dir rent.wks	Only RENT.WKS

This is a good technique to see if a particular file is there.

A:>dir s*.*	All filenames starting with "S".

If you can't remember the correct spelling of a name.

A:>dir *.wks	Displaying all files with the extension of "WKS".

To see all data files if they have the same extension.

There are some common standard extensions used by many programs:

EXE	-	Programs (executable files)
COM	-	Files containing commands
BAT	-	Batch files
WKS	-	Worksheet files (Lotus and VP Plannner)
DAT	-	Usually data
BAK	-	Backup files in case of lost or damaged files

FILE12

CHECK DISK COMMAND

The CHECK DISK command, or CHKDSK, analyzes the directories and files on the designated or default drive and produces a disk and memory status report.

The CHKDSK command format:

```
CHKDSK d:/f/v
     where d: is the designated drive
           /f option fixes errors that are found in the
              directory
           /v option display all files and their paths
```

Results of a CHKDSK done on a newly formatted 3.5" diskette ——————————>

```
C:>chkdsk a:

      1457664 bytes total disk space
      1457664 bytes available on disk
       654336 bytes total memory
       514176 bytes free
```

FILE13

FORMAT COMMAND

The FORMAT command initializes the disk in the designated drive to a recording format that DOS uses. This includes analyzing the entire disk for defective tracks and setting up the directory.

The FORMAT command format:

```
FORMAT d:/S/V
     where d: is the designated drive
     /S option copies the DOS operating system files
     /V option allows entering a volume label
```

The FORMAT command is very DANGEROUS to use because it destroys all data on the disk being formatted. Be sure you have the correct diskette inserted in the drive before use.

NOTE: The FORMAT command will initialize the diskette for the density of the disk drive in use. For instance, the PS/2 Model 50 will initialize the diskette in drive A: at double density. If you want to initialize the diskette at single density, see <FILE22 Single>

FORMAT COMMAND (Continued)

Example:

```
c:\>format a:/v
Insert new diskette for drive A:
and strike ENTER when ready

Format complete

Volume label (11 characters, ENTER  for none)?XX <

     1457664 bytes total disk space
     1457664 bytes available on disk
     Format another (y/n)?  <
```

Type volume label here

Put "y" here and insert new diskette. Put "n" here returns you to DOS.

CAUTION: THE FORMATTING DESTROYS ALL DATA ON THE DISK.

FILE14

RENAME Command

If you want to change a file's name, extension, or both, you can use the RENAME command. Nothing in the file is changed.

You can use wild cards (*) in the RENAME command.

The RENAME command:

The format for the RENAME command is

```
RENAME filespec1 filespec2
     where filespec1 is the OLD file name
           filespec2 is the NEW file name
```

For example, the command, RENAME data.exp answers.tst

will result the original file, "data,exp" to be renamed, "answers.tst". The original file will not be changed or disturbed in any way.

FILE15

COPY Command

The COPY command can be used to make a copy of a file. The way to move a file is to copy it and erase the old file.

You can use wild cards (*) in the COPY command.

The COPY command:

The format for the COPY command is

COPY filespec1 filespec2
where filespec1 is the file to be copied (source)
filespec2 is the destination file (target)

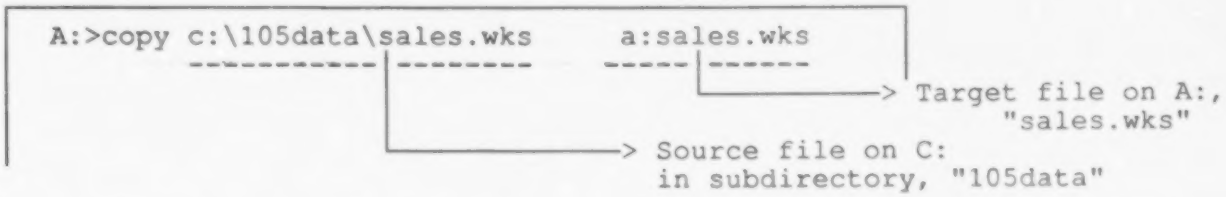
For example, the command,

```
COPY config.sys config.bak
```

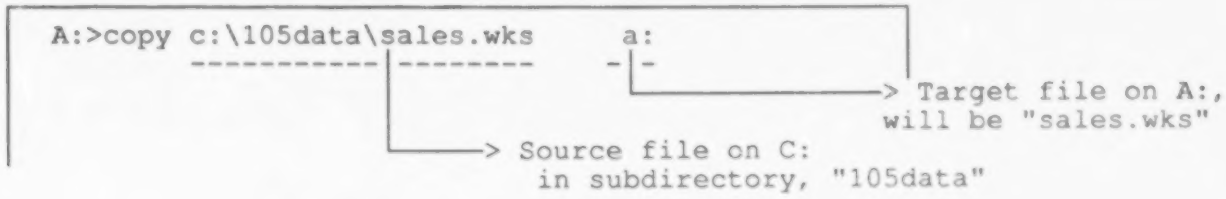
will result the original file, "config.sys" to be copied into a new file called, "config.bak". The original file will not be erased or disturbed in any way.

FILE16 MORE

The command can be used to copy a file to a diskette in a different disk drive:



However, if the file name is unchanged, you do not need to retype the name of the file:



Other examples:

The COPY Command	Would result in
A:>copy *.* b:	All files on drive A: copied to B:

This is the way to copy all files from one diskette on drive A: to another diskette on drive B:

A:>copy c:\105data a:	All files in the subdirectory copied.

This will copy all files in a subdirectory to be copied to the diskette in drive A:

C:>copy *.wks a:	Copies all files with the extension of "wks" to A:
B:>copy sales.* a:	Copies all files with the name of "sales" to A:

FILE16

The ERASE Command

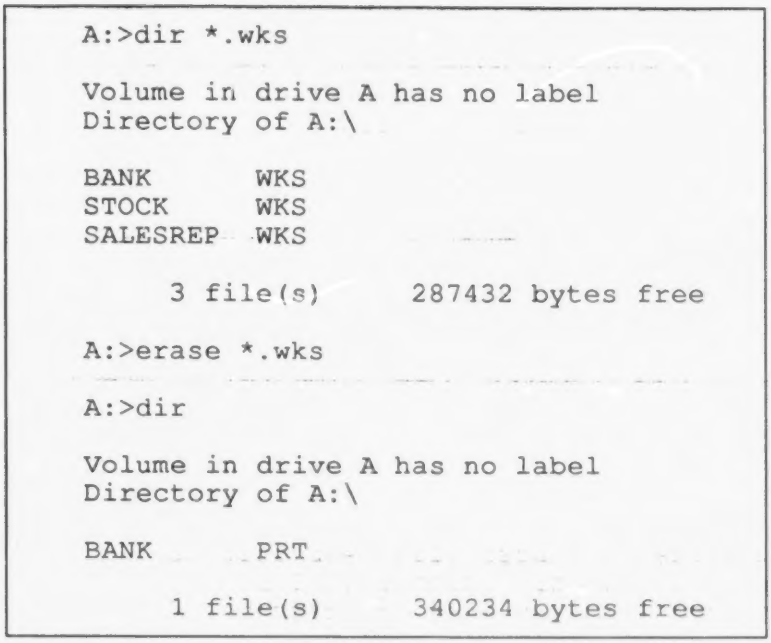
As you would expect, the ERASE command "erases" files or removes them from the disk. So you must be very careful that you erase the correct file.

```
C:>erase invest.wks

C:>_
```

This is what it looks like. Note that there is no acknowledgement that the file is erased. You can do the DIRECTORY Command if you want to be sure it worked. (dir invest.wks)

You can also use "wild cards" to erase multiple files. HINT: Do a DIRECTORY command, using the same wild cards before you use the ERASE command to make sure the correct files will be erased.


A:>dir *.wks
Volume in drive A has no label
Directory of A:\
BANK WKS
STOCK WKS
SALESREP WKS
3 file(s) 287432 bytes free
A:>erase *.wks
A:>dir
Volume in drive A has no label
Directory of A:\
BANK PRT
1 file(s) 340234 bytes free
<———First do the DIR
<——— This shows 3 files with WKS extensions.
<———Now do the ERASE with the same exact parameters
<———The DIR for all files show all WKS files are gone.

FILE17

TYPE Command

The TYPE command is used to show copy of a file on the display screen. The name of the command comes from the days when the output of a personal computer was a typewriter. Later the screen became the primary way to look at output, but the command was never changed.

> The format for the TYPE command is
>
> TYPE filespec1
> where filespec1 is the file to be shown on the screen

For example, there is a file called "hello.stu". To see what it looks like, try this. ——————————> <type hello.stu;pause>

Warning: if it is a large file, it will scroll up the screen so fast that it will be difficult to see.

FILE18

The CHANGE DIRECTORY Command

At any given time DOS assumes one of the disk drives is the "current drive". DOS then looks at that drive to execute any command. See <File21 Current Drive>

Similarly, DOS assumes that there is a current directory or subdirectory. The CHANGE DIRECTORY (or CD) Command allows you to switch between subdirectories.

To change directories, the CD Command is followed by the directory or subdirectory to be made current.

A:>cd\reports	will make the subdirectory, "reports" the current one.

The backslash symbol, "\" is the symbol for the root directory. It is also used to show subdirectories within directories.

File19 MORE

The CHANGE DIRECTORY Command (Continued)

The command, "CD\reports\annual" will change to a subdirectory named "annual" which is in the "reports" subdirectory on the current drive.

A:>cd\reports\annual	will make the subdirectory, "annual" which is in the "reports" subdirectory on the current one.
A:>cd annual	will make the subdirectory, "annual" which is in the current directory on the current drive.
A:>cd	will display the current directory's name on drive A:

File19

Starting Programs

DOS identifies programs that can execute by the extension in the filename. Files with extension of "COM" and "EXE" are the executable versions of programs that have been compiled, or compiled and linked. There are also files, called BATCH files with "bat" extensions that also can contain commands and therefore executable.

You can see what programs are on your disk by using the DIR Command, as "dir *.com" or "dir *.exe" or "dir *.bat".

To start one of these programs, they must be in the current directory in the current drive or have a path named to DOS.

See <File21 Current Drive>
or See <File19 Change Directory Command>

If in the current directory, type in the file name (the extension is not needed).

```
C:>reports
```

will start a program called "reports.com" in the C: drive

File20

The Current Drive

At any given time one of the disk drives is referred to by DOS as the "current drive". This means that DOS will look on that drive for the command to be executed. This saves having to always name the drive in issuing commands.

You can tell which drive is current by looking at the DOS prompt.

```
A:>_
```

shows that the A: drive is current

You can change the current drive by typing the letter of drive you want ---

```
A:>b:
```

will change the current drive to b:

Similarly, DOS assumes that there is a current directory or subdirectory. The CHANGE DIRECTORY (or CD) Command allows you to switch between subdirectories. See <File19 Change Directories>

File21

FORMAT COMMAND for Single Density

The FORMAT command initializes the disk in the designated drive to a recording format that DOS uses. DOS will format the floppy in the PS/2 Model 50 diskette drive at double density. However, the drive will read or write floppy diskettes at either single or double density.

To use the floppy diskette on some other computer at home or work at single density, use the following FORMAT Command with options:

The FORMAT command format:

FORMAT d:/n:9/t:80/V
where d: is the designated drive
/V option allows entering a volume label

The FORMAT command is very DANGEROUS to use because it destroys all data on the disk being formatted. Be sure you have the correct diskette inserted in the drive before use.

CAUTION: THE FORMATTING DESTROYS ALL DATA ON THE DISK.

FILE22

CIS 105 Disk Usage for WordPerfect

1. Boot (or warm boot) the PS/2. <File04 Booting>

2. After the WELCOME screen is shown, press RETURN to get to the DOS prompt. <File07 Prompt>

3. Change to the subdirectory that contains the WordPerfect program files (which is "\wp") with the CHANGE DIRECTORY (CD) Command:

```
cd\wp
```

<File19 Change Directory>

4. Start the WordPerfect program by typing, "wp":

```
wp
```

File23 MORE

5. To set drive A: as the default drive for your data storage, after the program starts, press the PF5 LIST FILES key.
The following prompt will appear at the bottom:

```
Dir C:\WP\*.*                    (Type = to change default dir)
```

Type "=" to change the default directory and
Type "A:" to change it to A:

```
=A:
```

The prompt at the bottom will change to:

```
Dir A:\*.*                       (Type = to change default dir)
```

Press PF1 CANCEL key to return to the editing screen. Whenever you save your file, it will be saved to your floppy in drive A:

YOU MUST DO THIS EVERYTIME YOU USE WORDPERFECT

File23

CIS 105 Disk Usage for VP Planner

1. Boot (or warm boot) the PS/2. <File04 Booting>

2. After the WELCOME screen is shown, press RETURN to get to the DOS prompt. <File07 Prompt>

3. Change to the subdirectory that contains the VP Planner program files (which is "\vp") with the CHANGE DIRECTORY (CD) Command:

```
cd\vp
```

<File19 Change Directory>

4. Start the VP Planner program by typing, "vp":

```
vp
```

5. VP Planner has been set up to use drive A: as the default drive and no action is required.

File24

CIS 105 Disk Usage for dBASE III Plus

1. Boot (or warm boot) the PS/2. <File04 Booting>

2. After the WELCOME screen is shown, press RETURN to get to the DOS prompt. <File07 Prompt>

3. Change to the subdirectory that contains the dBASE program files (which is "\dbase") with the CHANGE DIRECTORY (CD) Command:

```
cd\dbase
```

<File19 Change Directory>

4. Start the dBASE program by typing, "vp":

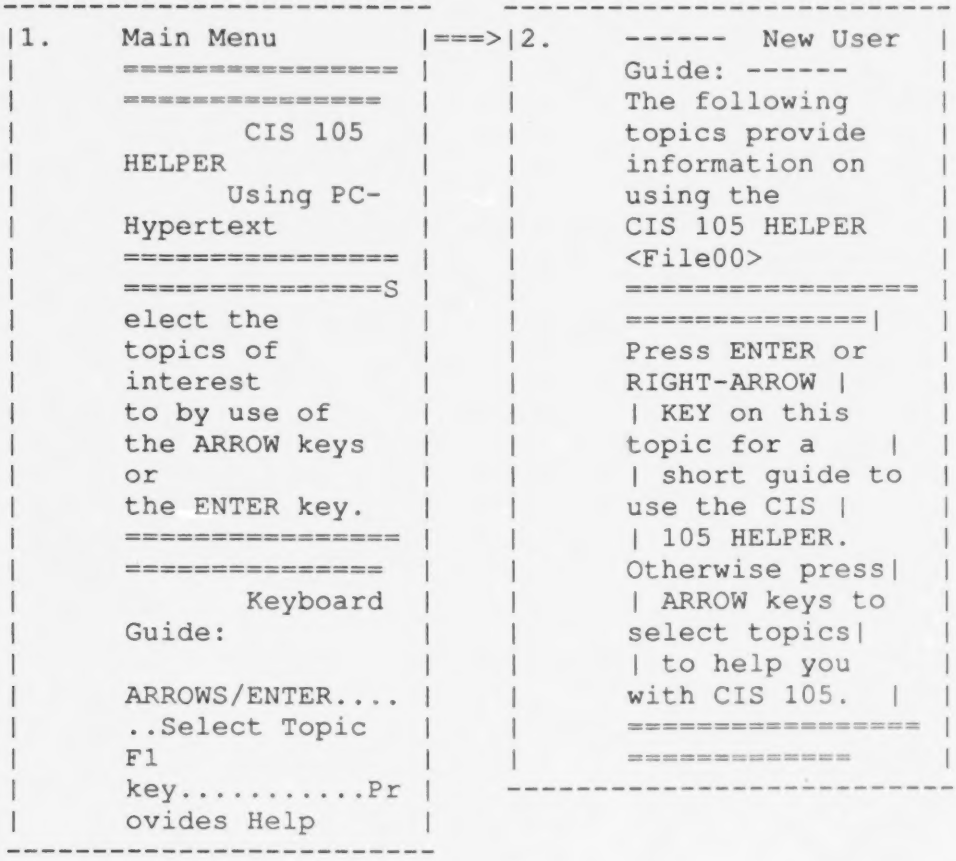
```
dbase
```

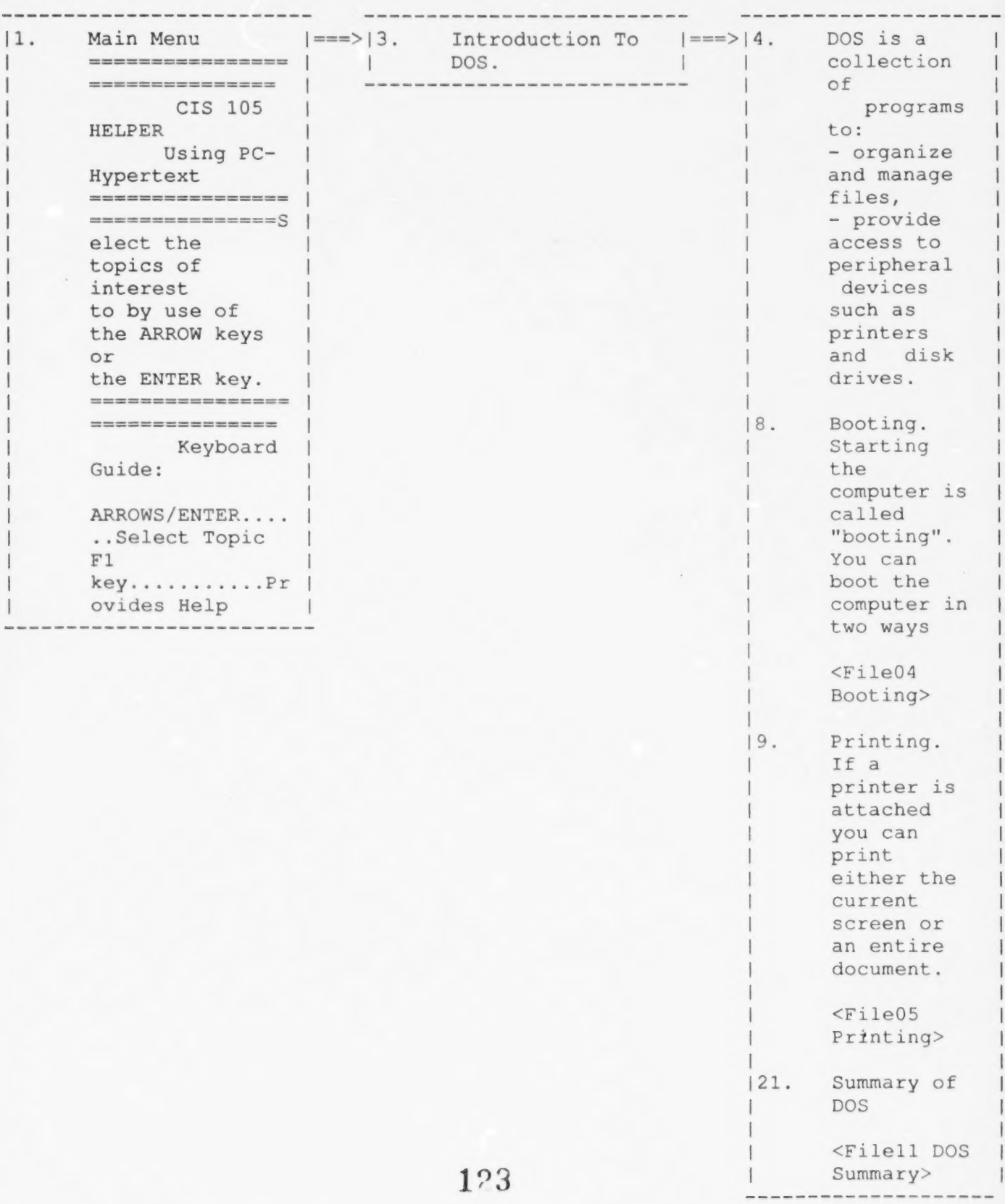
File25

APPENDIX F

CIS 105 HELPER
HIPO (Hierarchy plus Inputs, Processing, and Outputs)
Documentation

1. Main Menu
CIS 105 HELPER Using PC-Hypertext
Select the topics of interest to by use of the ARROW keys or the ENTER key.
Keyboard Guide:
ARROWS/ENTER..... .Select Topic
F1 key.....Provides Help
2. ------ New User Guide: The following topics provide information on using the CIS 105 HELPER <File00>
Press ENTER or RIGHT-ARROW | KEY on this topic for a | short guide to use the CIS | 105 HELPER. Otherwise press| ARROW keys to select topics| to help you with CIS 105.
3. Introduction To DOS.
18. Files and File Names <File10 Files>
10. Disks and Diskettes <File01 Disks>
11. Commands

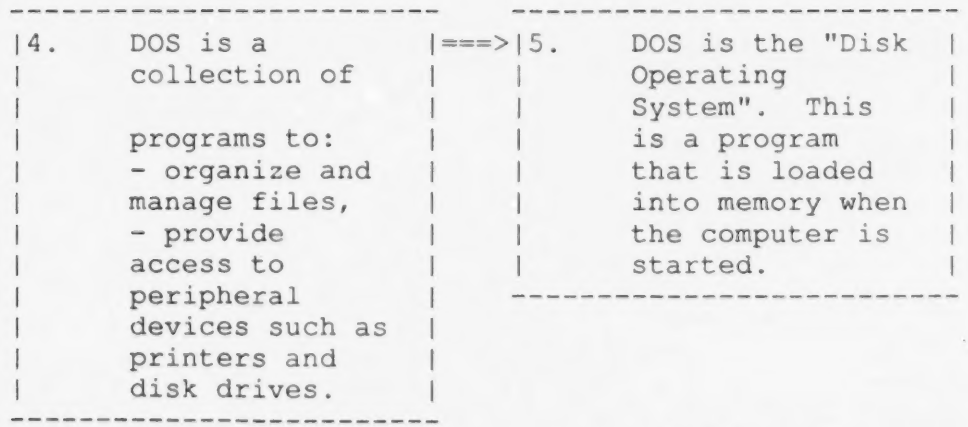

1. Main Menu
CIS 105 HELPER
Using PC-Hypertext
Select the topics of interest to by use of the ARROW keys or the ENTER key.
Keyboard Guide:
ARROWS/ENTER.... ..Select Topic
F1 key.....Provides Help
2. ------ New User Guide: ------
The following topics provide information on using the CIS 105 HELPER
<File00>
Press ENTER or RIGHT-ARROW KEY on this topic for a short guide to use the CIS 105 HELPER.
Otherwise press ARROW keys to select topics to help you with CIS 105.


1. Main Menu
CIS 105 HELPER Using PC-Hypertext
Select the topics of interest to by use of the ARROW keys or the ENTER key.
Keyboard Guide:
ARROWS/ENTER.... ..Select Topic
F1 key.....Provides Help
3. Introduction To DOS.
4. DOS is a collection of programs to:
- organize and manage files,
- provide access to peripheral devices such as printers and disk drives.
8. Booting. Starting the computer is called "booting". You can boot the computer in two ways
<File04 Booting>
9. Printing. If a printer is attached you can print either the current screen or an entire document.
<File05 Printing>
21. Summary of DOS
<File11 DOS Summary>

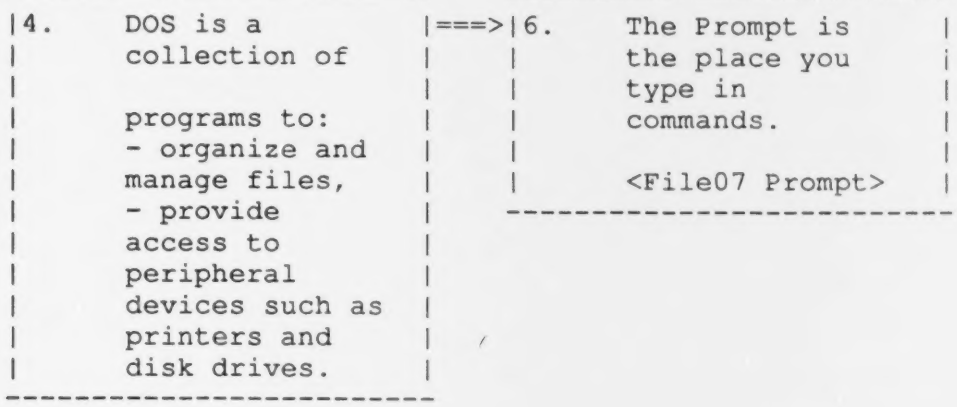
HOUDINI January 19, 1990 13:45 node 4

3. Introduction To DOS.
4. DOS is a collection of programs to: - organize and manage files, - provide access to peripheral devices such as printers and disk drives.
5. DOS is the "Disk Operating System". This is a program that is loaded into memory when the computer is started.
7. The Command Interpreter takes the commands you type in and controls DOS. <File06 Command Interpreter>
6. The Prompt is the place you type in commands. <File07 Prompt>

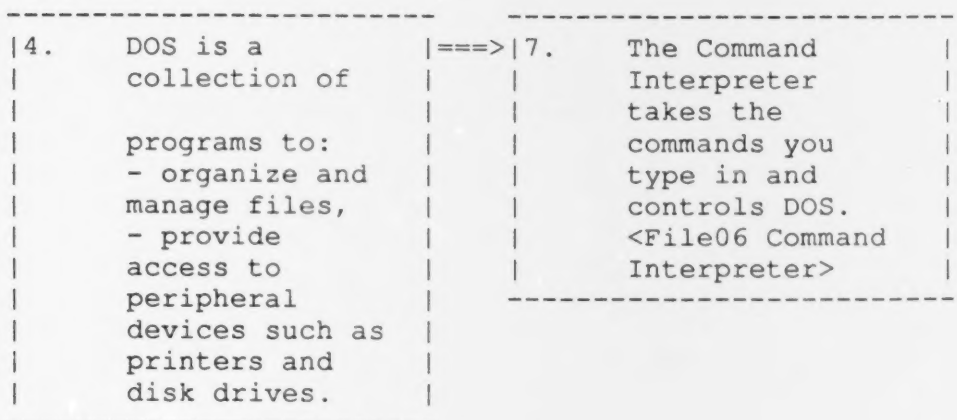
HOUDINI January 19, 1990 13:45 node 5


4. DOS is a collection of programs to: - organize and manage files, - provide access to peripheral devices such as printers and disk drives.
5. DOS is the "Disk Operating System". This is a program that is loaded into memory when the computer is started.

HOUDINI January 19, 1990 13:45 node 6



HOUDINI January 19, 1990 13:45 node 7



HOUDINI January 19, 1990 13:45 node 8

```
-------------------------     -------------------------
|3.    Introduction To  |===>|8.    Booting.          |
|      DOS.             |    |      Starting the      |
-------------------------    |      computer is       |
                             |      called            |
                             |      "booting". You    |
                             |      can boot the      |
                             |      computer in two   |
                             |      ways              |
                             |       <File04          |
                             |      Booting>          |
                             --------------------------
```

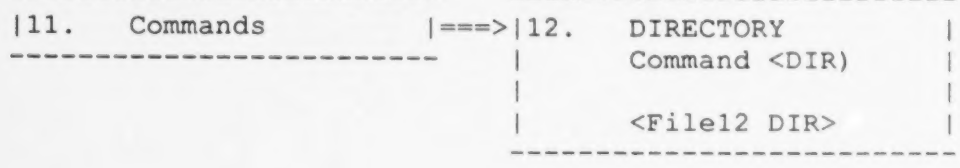
HOUDINI January 19, 1990 13:45 node 9

```
-------------------------     -------------------------
|3.    Introduction To  |===>|9.    Printing.         |
|      DOS.             |    |      If a printer is   |
-------------------------    |      attached you can  |
                             |      print either the  |
                             |      current screen    |
                             |      or an entire      |
                             |      document.         |
                             |                        |
                             |      <File05           |
                             |      Printing>         |
                             --------------------------
```

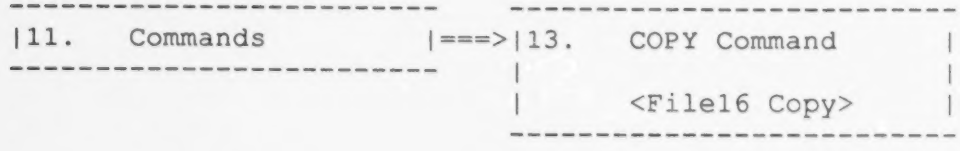
1. Main Menu
CIS 105 HELPER
Using PC-Hypertext
Select the topics of interest to by use of the ARROW keys or the ENTER key.
Keyboard Guide:
ARROWS/ENTER.... ..Select Topic
F1 key.....Provides Help
10. Disks and Diskettes
<File01 Disks>

1. Main Menu
CIS 105 HELPER Using PC-Hypertext
Select the topics of interest to by use of the ARROW keys or the ENTER key.
Keyboard Guide:
ARROWS/ENTER.... ..Select Topic
F1 key.....Provides Help
11. Commands
12. DIRECTORY Command <DIR)
<File12 DIR>
16. CHECK DISK Command
<File13 CHKDSK>
17. FORMAT Command
<File14 FORMAT>
19. RENAME Command
<File15 REN>
13. COPY Command
<File16 Copy>
14. ERASE Command
<File17 ERASE>
15. TYPE Command
<File18 TYPE>
20. CHANGE DIRECTORY Command
<File19 CD>

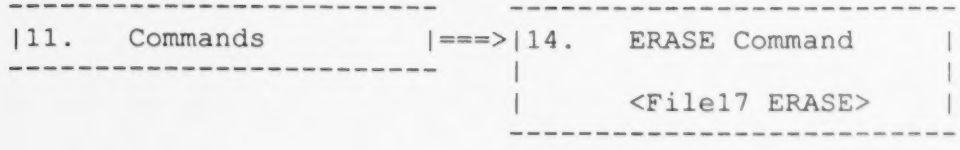
HOUDINI January 19, 1990 13:45 node 12



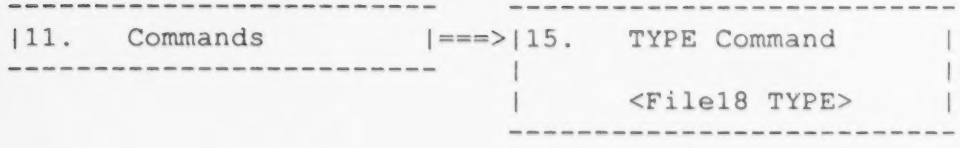
HOUDINI January 19, 1990 13:45 node 13



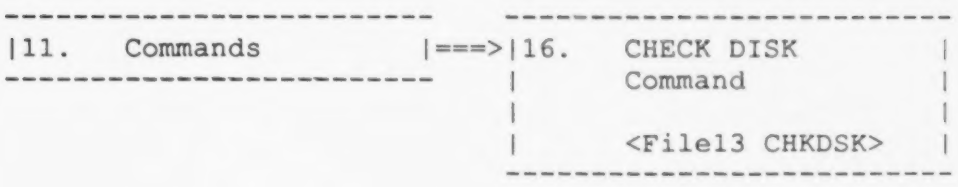
HOUDINI January 19, 1990 13:45 node 14



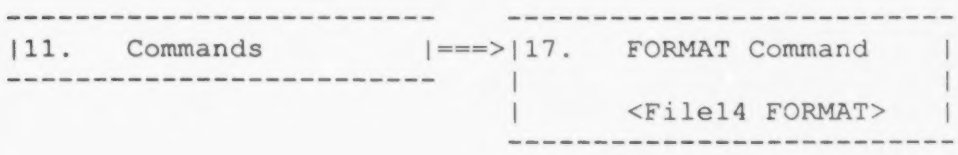
HOUDINI January 19, 1990 13:45 node 15



HOUDINI January 19, 1990 13:45 node 16



HOUDINI January 19, 1990 13:45 node 17



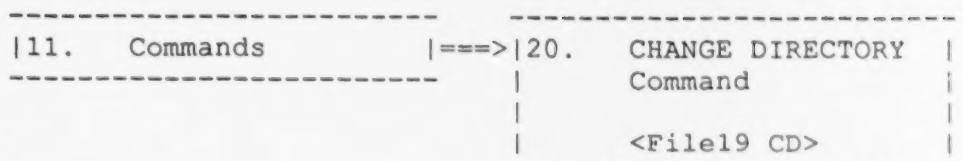
HOUDINI January 19, 1990 13:45 node 18

```
-------------------------     -------------------------
|1.    Main Menu          |===>|18.   Files and File    |
|      ================  |    |      Names             |
|      ================  |    |                        |
|             CIS 105     |    |      <File10 Files>    |
|      HELPER             |    -------------------------
|            Using PC-    |
|      Hypertext          |
|      ================  |
|      ================S |
|      elect the          |
|      topics of          |
|      interest           |
|      to by use of       |
|      the ARROW keys     |
|      or                 |
|      the ENTER key.     |
|      ================  |
|      ================  |
|             Keyboard    |
|      Guide:             |
|                         |
|      ARROWS/ENTER....   |
|      ..Select Topic     |
|      F1                 |
|      key...........Pr   |
|      ovides Help        |
-------------------------
```

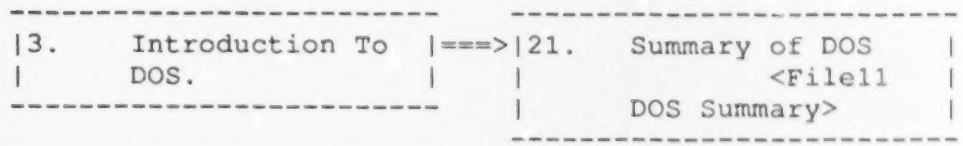
HOUDINI January 19, 1990 13:45 node 19

```
-------------------------     -------------------------
|11.   Commands           |===>|19.   RENAME Command    |
-------------------------     |                        |
                              |      <File15 REN>      |
                              -------------------------
```

HOUDINI January 19, 1990 13:45 node 20



HOUDINI January 19, 1990 13:45 node 21



APPENDIX G

"Using the Disk Operating System"

DOS Proficiency Test
Pretest and Posttest

Using the Disk Operating System

True or False - CIRCLE THE CORRECT RESPONSE

T F 1. A> displays a listing of the files on a diskette, pausing when the screen is full
T F 2. CD is the command for change directory
T F 3. /S clears the display screen
T F 4. RENAME copies DOS files to the diskette
T F 5. ERASE assigns a new name to a file
T F 6. DIR/P removes files you want to copy
T F 7. CLS is the DOS prompt for the root directory
T F 8. *.* means; any filename and any file extension
T F 9. source means to remove a file from the diskette
T F 10. FORMAT makes a diskette acceptable for DOS files

Multiple choice - CIRCLE THE CORRECT RESPONSE

11. The command to list the files on a diskette with only filename and extension:

A. DIR
B. DIR/O
C. DIR/W
D. DIR/P
E. DIR/S

12. DOS stands for:

A. Disk Operation Standards
B. Drive Operating System
C. Disk Opening Standards
D. Disk Operating System
E. Drive Operating System

13. Which of the following is the DOS command to move files to other disks:

A. DIR
B. FORMAT
C. RENAME
D. ERASE
E. COPY

14. Which of the following is the symbol for the root directory:

A. ~
B. \
C. |
D. %
E. #

15. The term "booting" refers to

A. replacing floppy disk inside the paper cover holder.
B. starting up the computer.
C. giving the system unit a slight nudge to get it going.
D. giving the system unit a swift kick to get it working properly.
E. bashing the keyboard with your fist because you are frustrated.

APPENDIX H

CIS 105, Survey of Computer Information Systems
Evaluation Questionnaire

CIS 105 - Survey of Computer Information Systems
Evaluation Questionnaire

This questionnaire is confidential and will not affect your grade in any way. Please answer the questions honestly and feel free to add comments on the back.

1. Please circle the number that best represents your level of experience at the start of this course in the following microcomputer applications:

None = 1
Very Little = 2
Some = 3
Quite a Lot = 4
Proficient = 5

a.	Using a computer	1	2	3	4	5
b.	DOS	1	2	3	4	5
c.	dBASE	1	2	3	4	5
d.	VP-Planner or 1-2-3	1	2	3	4	5
e.	WordPerfect	1	2	3	4	5

2. Please circle your opinion of the DOS Helper program for assisting you in learning DOS in the lab portion of this class:

Impossible = 1
Difficult = 2
Useful = 3
Helpful = 4
Made Lab Easy = 5

a.	Easy to use	1	2	3	4	5
b.	Terms well defined	1	2	3	4	5
c.	Value as a reference	1	2	3	4	5
d.	Value as learning tool	1	2	3	4	5
e.	Covered the material	1	2	3	4	5
f.	Time required to use	1	2	3	4	5

Thank You.

APPENDIX I

CIS 105 HELPER
Handout

CIS 105 Helper

INTRODUCTION

The purpose of this supplement is to assist you in learning DOS (Disk Operating System), by using a PC-Hypertext program, called "CIS 105 Helper".

PC-HYPERTEXT PROGRAM

The PC-Hypertext program is one that allows the user to browse through networks of information in different ways. It is up to you. You can do either of the following, or a combination:

1. FOLLOW THE MENU IN A "LINEAR" FASHION. That is, start at the first topic, then read the second, and so forth.

OR

2. GO TO THE TOPICS THAT INTEREST YOU. Read the topics and then go to those you are interested in or want to learn.

HOW TO START

To start the program, follow these steps:

1. Reset the PS/2 (warm boot) by depressing the CTRL, the ALT, and the DEL keys all at once.

2. Once the WELCOME screen comes up, press the ENTER key to get the DOS prompt (C:\>).

3. Change to the subdirectory that contains the DOS Helper program by typing in upper or lower case:

cd\doshelp

4. Start the program by typing:

doshelp

5. Press ENTER for information in how to use PC-Hypertext.

CIS 105 Helper

HOW TO USE HYPERTEXT

CIS 105 Helper is full of information on DOS. To browse, do the following:

1. Note where the highlighted text is located.

2. Press **ENTER** or **RIGHT-ARROW** key to select the topic highlighted.

3. Press **DOWN-ARROW** or **UP-ARROW** key to move the highlighter to the next (down) or previous (up) topic.

4. Press **RIGHT-ARROW** key to jump to the topic highlighted.

5. Press **LEFT-ARROW** key to return to the previous topic.

6. If you see the word, "MORE" at the bottom of the screen, you can see the next page by using the **PAGE-DOWN** key.

7. If you see another topic with a reference in angle brackets, you can jump directly to that topic. PC-Hypertext will remember where you came from. You can retrace your steps by pressing the **LEFT ARROW** key.

8. If you push a key and hear a "BEEP", there is no information in that direction.

Note: If you get lost, press the ESC key to return to the Main Menu.

HOW TO QUIT

There are some advanced commands listed along the bottom of the screen. Only two commands are useful. Use the space bar to move to the command and then **ENTER** to select.

Quit To leave the program.

Reference To select a list of the possible topics. Use as a review.